



**FOREIGN
BROADCAST
INFORMATION
SERVICE**

JPRS Report

Nuclear Developments

DISTRIBUTION STATEMENT A

**Approved for public release;
Distribution Unlimited**

DTIC QUALITY INSPECTED 5

REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL
INFORMATION SERVICE
SPRINGFIELD, VA 22161

19980529 123

10
46
A03

Nuclear Developments

JPRS-TND-88-003

CONTENTS

25 FEBRUARY 1988

AFRICA (SUB-SAHARA)

NIGERIA

- Akinyemi's Call for Black Bomb Spurs Debate 1
Advocated for National Defense, Security [THE AFRICAN GUARDIAN, 12 Nov 87] 1
Proposal Criticized as Naive [THE AFRICAN GUARDIAN, 12 Nov 87] 3

CANADA

- Transport Minister Crosbie on Plutonium Overflights [Vancouver THE SUN, 6 Nov 87] 5
Candu Heavy Water Technology Reportedly Stolen by Romanian
[Toronto THE GLOBE AND MAIL, 21 Dec 87] 5

CHINA

- Ministry Official: Daya Bay Last Nuclear Joint Venture
[Hong Kong SOUTH CHINA MORNING POST, 2 Dec 87] 7

EAST ASIA

INTER-ASIAN

- Japan, USSR Sign S&T Cooperation on Nuclear Fusion [Tokyo KYODO, 19 Dec 87] 9

JAPAN

- AEC Supports Nuclear Antihijacking Pact [Tokyo KYODO, 18 Dec 87] 9

LATIN AMERICA

ARGENTINA

- CNEA Head Discusses Nuclear Policy Issues
[Buenos Aires NOTICIAS ARGENTINAS, 24 Nov 87] 10
Ema Perez Cites Official Disinterest Factor for Low Morale in CNEA
[Buenos Aires CLARIN, 3 Nov 87] 10
Atomic Energy Consultative Council Planned [Buenos Aires TELAM, 19 Nov 87] 12

BRAZIL

- Aramar Center To Be Able To Produce Fuel Elements in 1988
[Sao Paulo O ESTADO DE SAO PAULO, 21 Nov 87] 13
Navy Said To Have Technology To Build Nuclear Submarine
[Rio de Janeiro O GLOBO, 20 Nov 87] 13

JAMAICA

- Absence of Legislation on Radiation Exposure Scored
[Kingston THE DAILY GLEANER, 15 Dec 87] 14

NEAR EAST & SOUTH ASIA

BANGLADESH

| | |
|---|----|
| Ershad Chairs Meeting To Discuss Nuclear Power [Dhaka THE BANGLADESH OBSERVER, 18 Dec 87] | 15 |
| Press Release on Radiation Level in Imported Milk [Dhaka THE BANGLADESH OBSERVER, 18 Dec 87] | 15 |
| Nuclear Power Engineer, Former AEC Member, Dies [Dhaka THE BANGLADESH OBSERVER, 1 Dec 87] | 16 |

EGYPT

| | |
|---|----|
| Nuclear Fuel Unit To Begin Production [Cairo AL-AHRAM AL-DUWALI, 29 Dec 87] | 16 |
|---|----|

INDIA

| | |
|--|----|
| Rajiv: India Will Make Nuclear Bomb If Forced [Calcutta THE TELEGRAPH, 29 Nov 87] | 17 |
| Gandhi Rules Out Nuclear Treaty With Pakistan [Calcutta THE TELEGRAPH, 18 Nov 87] | 17 |
| Pakistan Nuclear Program, INF Treaty Viewed [R. R. Subramanian; New Delhi THE HINDUSTAN TIMES, 18 Dec 87] | 17 |
| Launch Vehicle Engine Tested Successfully [Bombay THE TIMES OF INDIA, 3 Nov 87] | 18 |
| AEC Issued Notice on Periyar River Contamination [Bombay THE TIMES OF INDIA, 2 Dec 87] | 19 |
| Delay in Nuclear-Power Plant Commissioning Regretted [New Delhi PATRIOT, 27 Nov 87] | 19 |

PAKISTAN

| | |
|--|----|
| U.S. Bilateral View of Nuclear Issues Assailed [Karachi DAWN, 15 Dec 87] | 20 |
| Austria To Assist Nuclear Power Development [Iqbal Mirza; Lahore THE PAKISTAN TIMES, 26 Nov 87] | 21 |
| Nation's Nuclear Policy Defended [Lahore THE PAKISTAN TIMES, 16 Nov 87] | 22 |
| A. Q. Khan Interview: Journalist Reiterates Position [Kuldip Nayar; Calcutta SUNDAY, 20-26 Dec 87] | 23 |
| Commentary Alleges India Real Nuclear Threat [Shariq Jamal; Islamabad THE MUSLIM, 21 Nov 87] | 24 |
| Commentary Alleges Indian Insincerity on Nuclear Issues [Mohsin Ali; Karachi DAWN, 26 Nov 87] | 26 |
| Commentary Defends Need for Nuclear Development [Munir Ahmad; Lahore THE PAKISTAN TIMES, 14 Dec 87] | 27 |

SUDAN

| | |
|---|----|
| Former Officer Reveals Black Market Uranium Sales [Paris AL-MUSTAQBAL, 21 Nov 87] | 30 |
|---|----|

WEST EUROPE

FEDERAL REPUBLIC OF GERMANY

| | |
|--|----|
| Moscow, FRG Firms Cooperate on High Temperature Reactor | 32 |
| Joint Research and Development [Frankfurt/Main FRANKFURTER ALLGEMEINE, 3 Nov 87] | 32 |
| Siemens, Moscow Sign Agreement [Frankfurt/Main FRANKFURTER ALLGEMEINE, 19 Oct 87] | 32 |

FRANCE

| | |
|---|----|
| Nuclear Export Policy Examined [Christian Bourdeille, Virginie Ridet; Paris DEFENSE NATIONALE, Dec 87] | 33 |
|---|----|

IRELAND

- Banning of Plutonium Overflights Deemed 'Impossible'
[Colm Keena; Dublin *THE SUNDAY PRESS*, 29 Nov 87] 38

TURKEY

- Canadian Firm Drops Bid to Build Nuclear Plant [Istanbul *TERCUMAN* 6 Nov 87] 39

UNITED KINGDOM

- Decision To Withdraw From Geneva Lab Delayed
[Roger Highfield; London *THE DAILY TELEGRAPH*, 16 Dec 87] 39
Shortcomings in Post-Chernobyl Monitoring Noted 40
To Be Investigated [John Furbisher; Leeds *YORKSHIRE POST*, 19 Dec 87] 40
Report on 'Radiation Hotspot' [John Furbisher; Leeds *YORKSHIRE POST*, 28 Nov 87] 40

NIGERIA

Akinyemi's Call for Black Bomb Spurs Debate

Advocated for National Defense, Security
51000010 Lagos THE AFRICAN GUARDIAN in
English 12 Nov 87 pp 7, 8, 9, 11

[Article by Richard Umaru and Godwin Agbroko with reports from Joni Akpederi and Okey Ndibe]

[Text] "The triumvirate of African diplomatic power before the end of the century will consist of Nigeria, Zaire and Black-ruled South Africa."—Ali Mazrui: THE AFRICAN CONDITION

For the Third World, the phrase, "by the year 2000," is magical. It has become a kind of Aladdin's lamp by which it hopes to conjure all of such necessities of life as food, health and housing for its largely impoverished population. Even Nigeria's External Affairs Minister, Professor Bolaji Akinyemi could not help foreseeing a new security role for Nigeria in the context of this Black race at the magical turn of this century.

In a lecture to mark the first anniversary of THIS WEEK magazine in July 1987, Akinyemi declared: "I am...of the firm opinion that an organic attribute of Nigeria's defence posture by the year 2000 should be the development of a nuclear capability, either independently, or within a collective ECOWAS endeavour."

Said he: "While with the dropping of the atom bomb on Hiroshima and Nagasaki in 1945, the nuclear age began with the question of who ought to be the appropriate victims of nuclear weapons—whites or non-whites—that question has now shifted to who ought to be the appropriate possessors of nuclear weapons—whites or non-whites?"

Prof. Akinyemi's answer: As the richest, largest and most powerful Black country in the world, Nigeria has a sacred responsibility to challenge the racial monopoly of nuclear weapons by developing a "black bomb," thereby ensuring that if, in a moment of madness, there is a large-scale annihilation of man, it will not be racially one-sided."

Heated reactions followed Akinyemi's call, although he did not exactly sing a new tune. He even acknowledged that he drew from the wisdom of Professor Ali Mazrui, who, in his Reith lectures, advocated that Africa should look to the Niger Delta for its nuclear capability. Mazrui was particularly piqued by the insincerity in the international calls for non-proliferation of nuclear weapons. "Those who have already acquired the necessary capacity," he observed, "now assume the role of preachers telling others not to acquire that capacity while they

themselves retain it." He sees this as nothing short of declaring that "nuclear sauce is only good for northern geese, and not for southern ganders."

Mazrui's advocacy, however, is not so much concerned with racial parity in the annihilation of man in the event of a nuclear holocaust as with the fact that Third World possession of these weapons would ensure their eradication. His argument: "Only when unstable Third World rulers acquire these dangerous toys will the superpowers be converted to total military denuclearization." His logic is that the white man often threatens his mischievous child by telling him: "Behave yourself—or a big Black man will come and take you away." By extension, Mazrui foresees a situation where white adults could be threatened with the danger of big Black men wielding nuclear devices.

The Akinyemi lecture essentially reopens, and brings to sharper focus the on-going debate, even at official circles, about the need for Nigeria to possess nuclear weapons. Professor Iya Abubakar, a defence minister in the Second Republic had told WEST AFRICA magazine in 1980, that "Nigeria will develop nuclear technology for peaceful purposes and eventually become a nuclear power...Nigeria is a great country and it needs a strong, invincible and unassailable defence capability. It is only when she has become a nuclear power that she can boast of that status."

Critics are unconvinced. They see a quest by Nigeria for nuclear weapons as a flight in the face of economic reality. Says Sam Aluko, an Economics professor at the Obafemi Awolowo University, Ile-Ife: "The cost of a nuclear plant, enrichment and reprocessing facilities and of acquisition of expertise and uranium are so prohibitive as to make nuclear option unthinkable."

Chief Obafemi Awolowo, the late elder statesman, also warned: "If we want to embark on this sort of military capability, we would have to spend all that we earn every year in equipping ourselves militarily and even borrow in addition, and neglect everything else."

Against this opportunity cost, proponents of Nigeria's acquisition of nuclear weapons would be particularly pained that the country missed its opportunity to acquire nuclear power technology almost for nothing when it failed some 30 years ago to cash in on the opportunity presented by the atoms-for-peace programme of 1956-1962. The United States, which was the major financier of this programme, was still smarting from guilt over Hiroshima and Nagasaki and was eager to demonstrate the peaceful uses of the atomic revolution. The International Atomic Energy Agency (IAEA) had not been formed then. The Non-Proliferation Treaty (NPT) had also not yet come into operation. Other 'Third World' countries like Egypt, Zaire, India, Brazil, Indonesia obtained their first research reactor, as Dr. Shamsideen

Elegba, head of the Ahmadu Bello University (ABU) Zaire's centre for energy research and training puts it "simply by requesting for one with little or no financial obligation."

By the time Nigeria began to show interest in nuclear energy in the early seventies, the doors and windows had been virtually slammed on the new entrants by the nuclear power states. Nigeria's first concrete step in the search for nuclear technology came with the establishment, in 1977, of "centres of excellence in nuclear science and technology" in two Nigerian universities: the Ahmadu Bello University, Zaria, and Obafemi Awolowo University, Ife.

The effort to develop nuclear power technology in the country was motivated by three principal considerations. First, preliminary studies showed that the country possessed large deposits of radioactive minerals like uranium in at least six states: Sokoto, Bauchi, Kano, Gongola, Borno and Plateau. Secondly, Nigeria's neighbors, particularly the Republic of Niger, has rich uranium resources and the ex-colonial power in these states. France, has a monopoly of the exploitation of these sources. And France has always been hostile to Nigeria.

The third major consideration was the desire to use the huge financial income from oil in developing alternative sources of energy since oil is a wasting resource.

Perhaps one of the greatest temptations for Nigeria's current bid for the acquisition of nuclear power capability has to do with perceived threats from South Africa. Although Egypt and Zaire have nuclear facilities acquired during the liberal phase of the development of nuclear power technology, the nuclear programme of South Africa is the most advanced on the African continent.

South Africa is, of course, not a party to the NPT. Yet, thanks to the collaboration of the United States, the Federal Republic of Germany and Israel, the Republic of South Africa is today believed by experts to possess the H-bomb. South Africa is the world's second largest producer of uranium. The country's atomic energy board was inaugurated in 1949. In 1964 the country established the Rocket Research Institute. By 1973, this institute had become militarized with the creation of a propulsion division at the country's National Institute of Defence Research. Before then, in 1965, the US had supplied South Africa a 10 megawatts Safari-I nuclear reactor with 90 percent enriched uranium. And, in 1979 South Africa, with the Federal Republic of Germany and the United States, establish a uranium enrichment plant. Two years ago, South Africa's plans to actually test a nuclear device ended the cynicism of doubting Thomases about South Africa's sinister designs.

In 1975, therefore, the Federal Government commissioned a French company, the Bureau De Recherches Geologiques et Mineres (BRGM), to undertake a pre-feasibility study of uranium deposits in Nigeria. Following its findings, the Nigerian Mining Corporation, with the BRGM and the Atomic Energy Commission of France, carried out further exploratory studies.

In 1979, the Nigerian Uranium Mining Company (NUMCO) was established to continue the search for uranium in northeastern Nigeria. Early in 1983, the Federal Government guaranteed a N25 million loan to NUMCO and acquired 13 per cent of the stocks in the uranium mines at A Lit in Niger Republic. In their 1985 report, the French prospecting firm maintained that there were insufficient deposits for commercial exploitation. The report, in expert circles in Nigeria, is suspect.

Reliable sources told THE AFRICAN GUARDIAN in Kaduna and Zaria that last year, a West German nuclear technology vending company, Interatom, approached some well-placed government officials with proposals for a turn-key nuclear project to supply, at a commission of three million US dollars, a 30 megawatts Janus nuclear reactor (which will cost some 50 million US dollars); totalling \$53 million.

Officials in the Ministry of Science and Technology, which coordinates the two "centres of excellence", are said to be excited by Interatom's proposals.

Other experts involved in the nation's nuclear research are not. Amongst the arguments experts have marshalled against the turn-key 30-megawatts reactor proposal are:

—Some of the nuclear research centres had themselves, long ago, completed arrangements of the purchase, housing and installation of smaller research reactors of no more than one to three megawatts.

—The firm, Interatom, is not a reactor manufacturer. The Janus reactor is produced by GA Inc. of USA.

—The experience of other countries, particularly in the 'Third World' shows that a turn-key nuclear project is not the way to acquire or develop a nation's nuclear energy industry.

Our sources say there are four stages in the process of developing the capability to produce a nuclear bomb—stages which some officials in the Ministry of Science and Technology seems in a hurry to skip. The first stage involves the acquisition of a small teaching and research reactor of not more than three megawatts. This is used for the production of radio isotopes on a small scale and for the training of the technical and professional personnel.

The second stage follows after about five to 10 years, during which experience would have been acquired and a large crop of personnel in nuclear reactor physics,

reactor design, radio chemistry, health physics and thermal hydraulics would have been produced. This is necessary if the critical number of trained personnel is to be obtained. The next stage is the acquisition of a power reactor of about 200 megawatts which can produce electricity. It is also at this stage that a country is expected to generate enough nuclear wastes from which to produce the plutonium necessary for the manufacture of the bomb.

The experts told THE AFRICAN GUARDIAN that it would be tantamount to putting the cart before the horse for Nigeria to acquire the 30 megawatts Janus reactor before the necessary experience in nuclear energy and the critical personnel to man it have been acquired. What is needed, they say, is for the nation's "centres of (nuclear) excellence" to be allowed to procure their own small research reactors for the training of personnel who would later on be capable of operating bigger reactors, designing the nation's nuclear reactor and producing natural and enriched uranium from locally mined "yellow cake."

The experience of other 'Third World' nuclear nations bears this out. South Korea spent 10 years learning and training with a one megawatt Triga Mark II and a three megawatts Triga Mark II reactors before recently considering the purchase of a 30 megawatts material testing reactor. Indonesia started with a quarter megawatts Triga Mark II reactor for 20 years. It is only recently that it started installing a 30 megawatts Janus reactor of the type that Interatom is proposing to sell to Nigeria.

Experts calculate that to properly man such a 30 megawatts Janus reactor, Nigeria will require 1,000 trained professionals. There are hardly up to 100 such professionals in the country now. Thus, a Janus reactor of 30 megawatts capacity can only be operational in Nigeria if it is run by foreigners—a solution that will make nonsense of government's talk of self reliance, and above all, the need for secrecy.

At the Centre for Energy Research and Development (CERD) of the Obafemi Awolowo University, those working on the nuclear programme are playing the sphinx. Their unwillingness to talk, THE AFRICAN GUARDIAN gathered, was as a result of a SUNDAY SKETCH story of June 28, 1987 over which some of the members of staff are reportedly facing disciplinary measures. Some researchers reportedly told the Ibadan-based newspaper of the befuddled manner the nuclear programme is being handled. Two of them, Dr. A.O. Adegbulugbe and Dr. F.B. Dayo, who were among the first to be recruited for the programme, said the centre does not appear to have any goal. The centre, they insist, does not know whether it is training people to operate a power plant to generate electricity that would compete with gas and coal or whether they are being trained to build an atomic bomb. They maintain that even if the purpose of the programme is to be kept secret, those being trained

ought to know what they are being trained for. What appears to be most discouraging to the two researchers is that the reactor, the major tool of nuclear science, is not available at the centre.

Adegbulugbe said he now engaged himself with books on micro-economics. Mr. George Oso, the assistant chief engineer, and former head of the technical section of the centre said it took him only eight months after his recruitment in 1977 to realise that the government and the people at the University don't really know anything about the programme.

The unstable and insufficient funding of the existing nuclear energy research centers give little or no hope that this self-reliant strategy is being seriously considered by government. The funding of the "Centres of Excellence," for instance has declined from a high of about N4 million to each of these centres in 1982 to well below N.02 million last year.

This is why, Dr. Elegba of the ABU Centre believes that the "best gift the government can give ABU in this year of its silver jubilee anniversary is to grant it the funds with which the centre can purchase our own small research reactor." All that the ABU Centre can boast of now is a neutron generator which produces neutrons for irradiation. This is used for soil testing, metallurgical, forensic and food analyses.

Perhaps the seriousness with which government regards it two centres of nuclear research and training can be gauged from the fact that not a single representative of these centres is at the newly-constituted board of the Nigerian Uranium Mining Company (NUMC).

Proposal Criticized as Naive
51000010 Lagos THE AFRICAN GUARDIAN in
English 12 Nov 87 p 6

[Article by J.S. Zwingina: "The Black Bomb Illusion"]

[Text] The recent call by Nigeria's External Affairs Minister, Professor Bolaji Akinyemi for the manufacture, by Africans, of a Black bomb in 10 years is, indeed, very surprising, if not naive. It is surprising coming as it does from a professor of politics not given to glib talk. As his former student, the writer was rather shocked at the seeming thoughtlessness of this hitherto very thoughtful professor.

My surprise, as indeed of many other Nigerians, was based on the complete naivety of the proposal. The suggestion of the construction of a bomb, whether Black, white or yellow is an illusion from the standpoint of Nigeria's political economy and of military strategy in general. In terms of political economy, Nigeria's resources are extraordinarily weak and few. The Gross National Product (GNP) is small and declining; the manufacturing sector is in ruins; the food sector is very

shaky and heavily dependent on external assistance by way of food imports and farming aids, and unemployment is staggering and yet on the increase. For most Nigerians this is their primary concern and they would rather the government spent all its resources creating jobs, improving the quality of health, education, et cetera than on manufacturing rifles and tanks at the Defence Industries Corporation, Kaduna, let alone a bomb, a Black bomb.

Suppose we reason with the professor that all the above is not really relevant or important, particularly in relation to global politics, what is the prospect that Nigeria can manufacture a bomb even if we have to? To manufacture, a nation must first have a scientific community dedicated enough to do so. There must be sufficient and available facilities and technically competent laboratory assistants.

Then there must be a political will on the part of the regime which is, usually, generated by a hostile opponent or neighbour and a restive population calling for protection from the perceived enemy. In contemporary Nigeria, all the above conditions do not exist. Nigeria has no militarily significant neighbour to pose a threat capable of generating a war. We do not even have a distant enemy willing or capable of militarily fighting Nigeria. Libya is busy in Chad and cannot and does not entertain any illusions of fighting a country so distant as Nigeria. And who says that Libya is a naturally hostile country?

Take South Africa. South Africa has a bomb because it has a strong domestic economy financed by the transnationals and produced by oppressed Black labour. South Africa is a first world country in Africa. Its tragedy is that unlike European nations, South Africa is not willing to treat Africans as human beings capable of expressing political right. But South Africa is so busy fighting the African National Congress (ANC) and its white Liberals and Black neighbours that it can not strategically take on a fight with Nigeria. We seem to be so scared of South Africa that we attribute impossible situations to it or are the rules looking for enemies in order to justify the expansion of defence contracts?

If the External and Defence ministers agree to make a bomb, how will it be financed? Let us look at the US for an example. President Reagan's pre-occupation with defence build-up pushed government spending from \$66

billion in the first quarter of 1981 to \$917 billion in the fourth quarter of 1984, a rise of 39 per cent. As a result, the federal deficit rose from \$113 billion to \$176 billion in 1982 alone. In 1986 Reagan had to borrow \$170 billion to pay 1985 interests. He further borrowed \$11 billion to pay the 1984 outstanding interest as borrowing \$1.1 billion to pay interest on the repayments that were due in 1985. Today, the US is the most indebted nation in the world followed by Brazil and Mexico. Is Nigeria willing or even capable of repeating this sorry picture in Africa?

From a strategic point of view there is very little logic in making or having a bomb. If South Africa is the main motivation for having a bomb who are we going to kill with the bomb? If we drop a bomb on South Africa 90 percent of those who will die will be Blacks, the Blacks we want to help liberate. Is that our goal? Will it not be better to give the ANC the money we will use to develop the bomb so it can strengthen its political and military struggle against the apartheid state? Will it not even be cheaper to do so?

Let us, for the sake of argument grant that Nigeria can build a bomb and has built one, a Black one. The leaders will have been satisfied that we are an aspiring superpower, even if a regional one. We will then be the second regional superpower next to South Africa in Africa. How will our relations with South Africa be if we both have destructive bombs? If we use the relations between the US and USSR as an example, we will discover that their possession of destructive nuclear arsenals has brought them much closer political and; since Gorbachev, economically as well. The state of Mutually Assured Destruction (M A D) in which the two superpowers are in today has effectively reduced the possible cause of war between the two to either an accident, drug addiction or human error. A conscious decision on either part to wage a nuclear war is very unlikely because none of them will nor the world in general, be alive to count the costs. So does it not follow that a Black bomb will objectively promote peace between Nigeria and the apartheid state rather than destroy apartheid?

Isn't the call for the bomb an indirect call for a great historic compromise in the anti-apartheid struggle of Nigeria? I shudder to think that this is what the thoughtful External Affairs Minister was contemplating.

/06662

Transport Minister Crosbie on Plutonium Overflights

51200009 Vancouver *THE SUN in English*
6 Nov 87 p A8

[Text] Ottawa—The federal government will not allow anyone to fly plutonium through Canadian airspace at this time, Transport Minister John Crosbie said Thursday.

But the government will not categorically prohibit such flights and could approve them in the future, he told the Commons.

The issue has been simmering for months, since Japan and the United States started negotiating a deal that would allow Japan to reprocess spent nuclear fuel that originated in the United States. They signed the deal Wednesday in Tokyo.

The fuel, in the form of powdered plutonium, would be flown from Europe to Japan using a polar route, possibly with a refuelling stop in Alaska. The planes would likely fly over the Northwest Territories.

Opposition MPs say Ottawa should make it clear it will not allow such flights because of the risk of an accident and subsequent radioactive pollution problem.

Crosbie repeatedly told them the government would not take a firm position because there has not yet been a formal proposal for such flights.

"And if they make such a proposal at the present time we would have to say no because at the present time there's no suitable cask to carry that material that would stand the impact (of a possible crash)...."

Crosbie noted that it's possible suitable casks could be available in the future.

/9274

Candu Heavy Water Technology Reportedly Stolen by Romanian

51200010 Toronto *THE GLOBE AND MAIL in English* 21 Dec 87 p A10

[Text] Kingston—A Romanian spy stole lucrative technological secrets for producing the heavy water used in Canadian-designed Candu nuclear reactors 15 years ago, the former head of the Romanian foreign intelligence services says.

Ion Mihai Pacepa, 59, who is living under a new identity after defecting to the West in 1978, told The Kingston Whit-Standard that the heavy-water production plant that Romania is building to serve its Candu reactors is based entirely on technology stolen from Canada.

The spy, who worked as a chemical engineer in a Canadian nuclear plant, entered Canada in 1972 or 1973 and returned to Bucharest about 1978, Mr Pacepa said.

"If you have somebody who becomes an engineer working on the heavy-water technology, it's not difficult for him to get it because he worked with these blueprints every single day," Mr Pacepa, partly disguised by a wig, said in an interview near Washington Dec 8.

Mr Pacepa, who was with Romania's foreign intelligence service for 27 years, said the spy was among the first of "waves" of Romanian agents who infiltrated Canada to dupe the nuclear industry out of millions of dollars worth of Candu technology.

Ann Collins, an External Affairs Department spokesman, said that heavy-water technology has never been included in any sales contract with Romania but that Canada has agreed to sell virtually all other Candu technology to Romania.

Mr Pacepa said the espionage reduced the number of components and the volume of heavy water that Romania would have to buy from Canada.

"The operation came to us there with the goal of getting out of Canada as much as possible without spending, without paying the Canadian government."

Within two years of finding work in a Canadian heavy-water factory, the spy photographed virtually all the blueprints essential for production, Mr Pacepa said.

The film was sent to Romania via diplomatic pouches from that country's embassy in Ottawa, he said.

Mr Pacepa refused to give details implicating special Romanian agents in Canada, saying that he fears retaliation against his daughter and son-in-law, who live in Romania.

Mr Pacepa described the Canadian operation in *Red Horizons*, a book published four weeks ago chronicling his final years as a Communist spy chief.

He said he is living under fear of murder since his defection. His publisher confirmed that the U.S. Federal Bureau of Investigation is investigating a threat against him.

Other Canadian espionage targets cited in the book include Combustion Engineering of Ottawa and Donlee Manufacturing of Toronto.

James Donnelly, president of Atomic Energy of Canada Ltd., said the heavy-water technology could have been purchased for \$10-million.

"I'm a little surprised that he says he's put all this effort into stealing, AECL's heavy-water technology," Mr Donnelly said.

While Mr Donnelly dismissed Mr Pacepa's claims as improbable, he acknowledged that it is unlikely AECL's internal security would have uncovered "deep spies" in any of its installations.

For at least 20 years, he said, AECL has repeatedly been warned by Canadian intelligence officials to be wary of temporary workers from Romania.

Rather than try to defend itself against spies, AECL decided to offer to licence as much proprietary information as possible to the Romanians at a reasonable cost.

"And we would have transferred heavy-water technology if they had wished," Mr Donnelly said.

Romania told AECL it did not need Canada's heavy-water technology because it was working on technology of its own based on articles published in technical journals, he said.

The export of heavy water is controlled by the International Atomic Energy Agency because of its key role in the production of plutonium for nuclear weapons.

As far back as 1967, Romania began negotiations to purchase Canadian nuclear reactor technology developed by AECL, a Crown corporation.

The Candu reactor is the world's only nuclear electric generating system to use unenriched uranium, which Romania is said to have in ample supply. It also uses heavy water—deuterium oxide—to control the nuclear reaction.

Early in the negotiations, Romania indicated that it intended to buy as many as 20 reactors, but the number gradually fell to two.

Romania signed its first purchase agreement with Canada in 1978. A second reactor was added to the contract in 1981.

Construction of the reactors at Cernavoda is years behind schedule. Canadian officials do not expect the first reactor to be operating until 1991 or 1991.

Mr Pacepa said that all the spies used before 1978 were engineers, capable of competing professionally with their Canadian colleagues and gaining access to technical secrets.

Many had papers identifying them as Western citizens and were fluent in English. Still others posed as temporary trainees in the nuclear industry and as refugees fleeing from Romanian communism, he said.

Nuclear industry officials confirmed that hundreds of Romanians have travelled to Canada as part of the Candu contract between the two countries. Many are still in Canada.

Michael Ledeen, a senior fellow in international affairs at the Center for Strategic and International Studies in Washington who served as special adviser to former U.S. secretary of state Alexander Haig, said that Mr Pacepa is considered so reliable that in 1984 the U.S. government reversed its decision to sell its Landsat satellite to Romania based on his assurances that the technology would probably end up in Soviet hands.

/9274

Ministry Official: Daya Bay Last Nuclear Joint Venture

51400001 Hong Kong *SOUTH CHINA MORNING POST* in English 1 Dec 87 pp 1, 2

[Text] The Daya Bay nuclear power station will probably be China's first and last joint-venture development of a foreign-designed nuclear plant, a senior official of the Ministry of Nuclear Industry said yesterday.

China was not interested in entering into new joint-venture nuclear projects although it would continue to build nuclear plants, importing only foreign technology to do so, the chief official of the Ministry's safety bureau, Mr Ren Jingxuan, said.

"We're not likely to have another project like Daya Bay, which involves the importation of key personnel and a complete plant from abroad.

"Daya Bay is an experience to be digested. We have become quite capable of developing our own plants, and foreign investment is not crucial," said Mr Ren in an interview with the *SOUTH CHINA MORNING POST* in Shenzhen yesterday.

He was in the Special Economic Zone to attend a five-day conference on nuclear energy organised by the Chinese Nuclear Society and the Chinese Society of Environmental Sciences.

Mr Ren cited the power plant being built 125 km south of Shanghai as proof that China could design and construct nuclear stations on its own.

China began developing pressurised reactors in Qinshan and Daya Bay (Shenzhen) in the mid-1980s.

The 300-megawatt reactor in Qinshan is domestically-designed with some equipment imported from abroad.

The two 900-megawatt reactors at Daya Bay plant, on the other hand, are supplied and installed by French companies.

A joint-venture group of French, Chinese and Japanese contractors is responsible for civil construction works at the site 52 km northeast of Hong Kong.

Mr Ren said although the development of nuclear industry in China depended heavily on the availability of funds, foreign investment was not seen as an ideal solution.

The \$28.8 billion Daya Bay project is a joint-venture between the China-owned Guangdong Nuclear Power Joint Venture Company and the Hong Kong Nuclear Investment Company, a subsidiary of the Kadoorie family's China Light and Power Limited.

"There are pros and cons to having foreign partners. As far as technology is concerned China does not need much help from foreign countries because we have so many nuclear experts and 30 years of experience.

"We will still be importing equipment and technology where necessary but self-reliance will be the general principle in the years to come," said Mr Ren.

His remarks echoed statements by senior Chinese leaders who since last year have been advocating the development of nuclear energy through domestic efforts.

The trend is seen as a departure from that of the late 1970s and early 1980s, when foreign capital and co-operation were deemed pivotal for the industry.

China, which unveiled ambitions to build 10 more nuclear stations by the end of the century, has been negotiating with European, Japanese and American firms regarding development prospects in the past few years.

Plans have since been scaled down, however, and some of the talks were said to have been cancelled or postponed indefinitely in line with the new policy of self-reliance in the nuclear industry.

Nuclear experts, including Mr Ren yesterday, said priority would be given to coal and hydroelectric power stations until at least the next decade.

Mr Ren revealed that the second phase of the Qinshan project would go ahead with the construction of two additional 600-megawatt reactors to be made domestically.

The expansion of the plant was aimed at providing electricity to larger areas of Zhejiang and Huadong on the east coast.

Also in the pipeline were plans to build nuclear stations in Liaoning in the northeast and Fujian in the southeast near Guangdong, said Mr Ren.

China was currently drafting laws and regulations on nuclear energy, he added. A set of regulations on contingency measures applicable to nuclear developments would be released by the State Council by the middle of next year, he said.

"The draft of the nuclear energy law is already complete and is being studied by the Standing Committee of the National People's Congress. It will be China's first nuclear legislation when approved," said Mr Ren.

At yesterday's conference—China's first on nuclear energy and the environment—experts from Beijing and Zhejiang, where the Qinshan station is being built, urged the public to dispel fears of and suspicions about nuclear power. An engineer of the Beijing-based Chinese Nuclear Society said the Chernobyl accident last year had tarnished the image of nuclear energy and lent ammunition to those opposed to its use.

"The challenge for Governments today is to restore the image of nuclear energy as a clean and superior form of

electricity supply. Many anti-nuclear people—including the press and politicians—are capitalising on accidents to make their voice heard," said Mr Lu Guangyi.

He said China fortunately did not have an anti-nuclear lobby although residents in the vicinity of the Qinshan and Daya Bay plants had expressed concern about safety and environmental implications.

07310

INTER-ASIAN

Japan, USSR Sign S&T Cooperation on Nuclear Fusion

*51600010 Tokyo KYODO in English
0154 GMT 19 Dec 87*

[Text] Moscow, Dec 19 KYODO—Japan and the Soviet Union have agreed to exchange scientific information on agriculture and forestry, plasma and nuclear fusion, radiological research, artificial heart and other matters under a Japan-Soviet scientific cooperation program for 1988.

The program was signed here Friday at the end of the fourth meeting of the Japan-Soviet Scientific and Technological Cooperation Committee, according to Japanese sources.

Experts will be exchanged under the program.

In the farm and forestry section, the cooperation program will cover breeding studies, biotechnology application research and measures against the disease of pine trees.

The radiological effect on humans from exposure to low-level radioactivity will be a main theme in the radiological cooperation program.

Under the program, exchanges will be made between Japan's National Institute of Radiological Sciences and a Soviet radiological center which was established in Kiev after the Chernobyl Nuclear Power Plant accident in April 1986.

However, it is not yet clear whether a pathological trace survey of the Chernobyl survivors, requested earlier by Japan, can be conducted under the bilateral cooperation program. Concrete cooperation in the study of nuclear fusion will follow the start up of the Soviet T-15 Tokamak nuclear fusion experimental equipment.

/06662

JAPAN

AEC Supports Nuclear Antihijacking Pact

*51600009 Tokyo KYODO in English
0158 GMT 18 Dec 87*

[Text] Tokyo, Dec. 18 KYODO—The Atomic Energy Commission (AEC) decided Friday Japan should quickly join an international convention for protecting enriched uranium and plutonium at nuclear power plants from hijacking and other acts of terrorism.

In the light of the decision, the government will present a bill to revise the nuclear reactor control law, which is necessary to introduce the convention in this country, to the Diet next spring.

Twenty-two countries have entered the international treaty on safeguards for nuclear substances which was adopted by the International Atomic Energy Agency (IAEA) in 1979 and went into effect last February. The members include the United States and the Soviet Union.

Japan, while supporting the intent of the pact, has withheld its membership because domestic laws must be amended beforehand to include new clauses empowering the government to impose criminal charges on potential hijackers of radioactive substances being transported across national borders.

However, Japan's criminal code was revised this year to cover cross-border criminals covered by any international treaty that Japan enters.

The government's nuclear reactor control law revision will include provisions for strict punishment of those who carelessly leave nuclear substances unattended, causing a risk to the public, in addition to the antiterrorism clauses.

These Japanese moves are expected to affect debate in the U.S. Congress on the safety of transporting plutonium by air, a precondition of a new Japan-U.S. nuclear power treaty.

/06662

ARGENTINA

CNEA Head Discusses Nuclear Policy Issues

PY250118 Buenos Aires NOTICIAS ARGENTINAS in Spanish 1305 GMT 24 Nov 87

[Text] Buenos Aires, 24 Nov (NA)—CNEA President Ema Perez Ferreira today voiced her opposition to possible privatization of nuclear plants; criticized some aspects of the management of her predecessors, Admiral Carlos Castro Madero, retired, and Alberto Constantini; and announced that the final feasibility studies for the construction of a "nuclear waste dump" in the country have been postponed until next year.

The eminent physicist stated that the government must demonstrate "some expression" of explicit support to the nuclear policy and decide whether this sector is a priority among its objectives. She also admitted that there are difficulties in fulfilling international commitments for the supply of enriched uranium.

In remarks to the magazine SOMOS Perez Ferreira, who is also a member of the Council for the Consolidation of Democracy, stated that the nuclear policy was outlined during Castro Madero's administration under more favorable economic conditions. "Certain unfinished projects, such as Atucha II and the Arroyito Heavy Water Plant, are taking a longer time to complete, and so it is predictable that they will, of necessity, fall into a less favorable cycle of the country's economy."

When she was told that President Raul Alfonsin stated, in a speech delivered on 30 May 1986 in Cordoba, that the uranium enrichment plant in Pilcaniyeu will essentially be in operation this year, she said that "some installations still need to be completed at the Pilcaniyeu plant in order for production to reach 100 percent."

Perez Ferreira added that "the plant is operating anyhow, but it is not yet—and it is very difficult for me to predict at this moment when it will be—fully operational."

She added that "it cannot produce 500 kg of uranium enriched to 20 percent, which was the objective set in that speech."

When she was told that on that occasion Alfonsin also promised that the zirconium sponge manufacturing [fabricacion de esponja de circonio] pilot plant will be ready by 1990, she said that "this objective has not been abandoned, but it is not possible to fulfill it on that date due to a lack of resources, and because we decided, on reassigning resources, to postpone the zirconium plant and to accelerate the Pilcaniyeu plant."

Regarding the conclusion of studies for the construction of a "nuclear waste dump," which Alfonsin said, in that speech, will be ready this year, she said that "it is obvious that it will not be possible to finish it this year, and I think it will be very difficult to finish it next year."

Asked whether Constantini has made a mistake in deciding for the sort of mini-nuclear plan announced by Alfonsin last year, she said: "What was presented there was a reasonable program with limited resources."

"To fulfill these objectives we need resources and personnel working with enthusiasm, knowing they are respected and well paid," she said.

She warned, however, that "currently the human resources not only go away, but those who stay feel disheartened; consequently, both factors delay the established objectives."

The CNEA president stated: "I do not believe a privatization of nuclear electricity generating plants is conceivable."

She added: "However, there are many possibilities for private capital in other activities, such as in factories of fuel elements or of special alloys, where it is already present."

She said that "within a year and a half" the project to exchange enriched uranium at different levels with Brazil could be fulfilled.

Asked whether the delays the CNEA is facing could hamper commitments for the supply of enriched uranium from the Pilcaniyeu plant, she admitted that "if we do not progress a little, next year we won't be able to fulfill our international commitments on time."

She concluded by saying that "regardless of the delays at Pilcaniyeu, the timetable for the supply of enriched uranium to Algeria, which is the most immediate project, will not be affected."

Ema Perez Cites Official Disinterest Factor for Low Morale in CNEA

51000009 Buenos Aires CLARIN in Spanish

3 Nov 87, Science and Technology Section, pp 1-2

[Interview with CNEA head Ema Perez Ferreira by Eleonora Gosman; date and place not given]

[Text] Bureaucratic hindrances, low wages, financial difficulties, the impossibility of maintaining the professional staff, which is deteriorating increasingly—these are the problems plaguing the National Atomic Energy Commission (CNEA). Ema Perez Ferreira, who became head of that body in May of this year, feels that the spirit of the group which had always existed in the body and which, in her opinion, is what made the advances in the nuclear realm possible, is dwindling. She also warns that

the capacity of the CNEA to generate human resources is in danger, and that if this situation continues much longer, the scientific-technical advance will be threatened.

[Question] What is happening with the National Atomic Energy Commission?

[Answer] Day after day we are struggling with an exhausting heritage. We have a legacy of commitments from the immediately preceding period which cannot be met because they go against the domestic interests. But that is not all. Things which were never seen before can be observed in the commission—people are throwing up their hands, and their dedication is vanishing. It would seem that in these recent years, the spirit of the CNEA corps—which might perhaps have led to some excesses, but which proved basic in achieving things, in advancing—has been ruined. This spirit has dwindled.

[Question] And the reason is the low wages....

[Answer] The low wages and the apparent disinterest on the part of the national authorities in the priority which our activities have. This is discouraging.

In any case, when an appeal is made to their sense of responsibility, the people still respond.

[Question] If this crisis situation in which the commission finds itself is prolonged, will we not within a short time find ourselves on the brink of a scientific and technological lag which cannot be made up?

[Answer] If it lasts long, yes. If things do not right themselves within a reasonable time, the deterioration will have become irreparable. I would say that we are still moving forward. If I try to compare the picture with what we had 10 years ago, I can say that the same goals of contributing to technological autonomy as prevailed then are still being pursued, but efficiency has suffered in our daily activities. The people function as if they were tired, exhausted.

For example, the nucleus for the reactor for Peru has been completed. And this required a considerable effort. This means, then, that work was done. But I wonder how much more speedily and more efficiently the work could have been done in another state of mind. And the state of mind is determined both by the wage issue and by the lack of confidence in the fact that the country expects something of us.

[Question] A few days ago, a representative of the Yugoslav Government said that after Chernobyl, it was decided to suspend nuclear projects. This would seem to be an international trend. Is the world perhaps changing its approach with regard to the benefits of this technology?

[Answer] This gentleman, with whom I talked during a visit to the nuclear fuel plant in Ezeiza, expressed regret at the reaction caused, especially among young people, who are very vulnerable to and get carried away by antinuclear campaigns. This forced the Yugoslav Government to postpone new undertakings in the nuclear-electric generation sector until the year 2000. But postponement is not the same as cancellation.

[Question] But there are other countries as well which have suspended their programs.

[Answer] We were drafting a document on the international situation in this connection, and it is very interesting, because it shows that the world is continuing to advance, with the exception of some countries in which popular referendums have proved adverse to these projects. Also, in the United States, there are no new purchase orders for nuclear plants, but there are no new orders for the purchase of electrical plants in general, either. This is very important. The current trend toward improving the use of energy sources and economizing on energy have led to an excess supply. In view of this, it is logical that all power-generating projects would slow down.

[Question] As a result of this relative paralysis, many people in Argentina are asking whether it is sensible or not to continue with the nuclear plan as we had established it.

[Answer] From the strict point of view of demand, it may be possible to satisfy the requirements in the coming decade with other resources which are not nuclear. But the time will come when this appears as the only solution, and if we destroy the continuity in our technological development in the nuclear sector, we will find ourselves obliged to purchase plants complete and ready for use. But I do not believe that in order to maintain the capacity achieved in the nuclear sector, such frequent projects as were scheduled in the 1979 plan would be necessary.

[Question] Do you think that perhaps with the lengthening of the intervals, the longer periods of time available could be utilized to design and build our own nuclear-electric power plant?

[Answer] Such a proposal is not unreasonable. This is precisely what we are analyzing. Some foreign visitors have expressed surprise that we have not yet made a start in this direction. It seems that there is more confidence in us abroad than we have in ourselves.

[Question] A short time ago, a former president of the commission maintained that the agreements with Brazil in the atomic sector were a fantasy. He said that the development of a fast breeder reactor project made no sense. Do you believe consideration of this program is desirable?

[Answer] The only thing which makes it difficult to contemplate an intensive program in this direction is the lack of resources. For this reason it is necessary to be cautious. But we already have, have had for some years, a group of people working on the subject, including professional experts in France.

This alternative represents a very superior fashion of using our uranium resources. The country has reasonable mineral resources, but they are not infinite. A better way to utilize them is by recycling them in thermic reactors. The other is to look at the potential of fast reactors. The interest in this joint development with Brazil is based on the fact that the studies have been viewed from another angle. A reactor of this sort is cooled with sodium and the cycle is rather complex to manage. The Brazilian effort is oriented in this direction. On the other hand, we are pursuing the path of studying the neutron aspects of the reactor. This complementary aspect, then, appears to be a very logical and credible thing. Obviously, if we made it our goal to have a fast reactor functioning by the year 2010, this would indeed be a fantasy.

[Question] What projects have priority in the distribution of the budget?

[Answer] Among them is the Carem Project being carried out by the INVAP, and the development of the mixed oxides project, in order to use them in operating plants. In addition, we have put particular effort into ensuring resources for the radiological protection and safety sector. In connection with radioisotopes, priority is being given to the treatment of molybdenum sources for medical applications. And in nuclear materials, emphasis is on the development of a domestic line of uranium oxide. In research, we are trying to provide all the support we can for the work being done on superconductivity at the Bariloche Atomic Plant.

[Question] But there are complaints in the CAB that full support is not available and that there are bureaucratic hindrances.

[Answer] They are right. It would be natural for them to have a number of scholarship students included on a permanent basis, with payments which are at least a little more reasonable than the scholarship level. But this is not possible because the available positions have been frozen.

[Question] And what is being done to overcome this difficulty?

[Answer] We have hopes of being able to overcome the problem of the vacant positions. We have agreed in discussions with the economic team to a whole package of measures including the wage issue and lifting the freeze on the staff situation. This will enable us to recognize the merit of individuals through promotion and inclusion in the scholarship program. In addition,

we have submitted a proposal for exemptions from the freeze, based on certain programs, but not indiscriminately. It is urgently necessary to rebuild capacity.

[Question] Does this mean that there has been an important drain?

[Answer] That is beyond doubt. In this sector, it is necessary to maintain a certain capacity on the higher levels so as to be able to train new strata. I do not say that this capacity has been lost, but it has been weakened.

New blood can move up in level when there are those higher up to train them, but if that level weakens, the possibility of regenerating this capacity is lost. I do not know how long the commission will maintain its present capacity to generate human resources. I have just sent a special proposal to the government, urging that the staff at the nuclear plants be so assigned that the volume will guarantee the optimal operation of the plants. The least I can demand is that it be maintained, because this is a technical criterion, and if it is not maintained, operational capacity will be weakened.

[Question] There is talk of decentralizing the commission, of making some sectors private as a way of making them more efficient. Do you believe that this reorganization would have advantages?

[Answer] Concerning the proposals which have been made on this subject outside the commission, I must say that some aspects could be utilized. But what I question is how they were set forth. I would say that the CNEA should seek the most advantageous legal means of facilitating its work. When the stage of routine production of goods or services is reached, it should be transferred to the private sector, while the CNEA should retain and ensure control of the substantive aspect, which is technology. Given the present national context, this is one possible method. The country is not the same today as it was 35 years ago. Thus it is necessary to adapt activities in the most intelligent way possible. The national treasury is exhausted, and we must seek other means in order not to lose the benefit of all of the effort put forth. The proper forms for using private capital must be found, but the essential thing—control of the technological resources—must be retained.

5157

Atomic Energy Consultative Council Planned
PY201111 Buenos Aires TELAM in Spanish
1052 GMT 19 Nov 87

[Text] Buenos Aires, 19 Nov (TELAM)—The government has decided to create a National Atomic Energy Consultative Council [Consejo Consultivo Nacional de Energia Atomica], whose main objective will be to advise the CNEA president in drawing up studies and projects in the reorganization of nuclear activities.

According to Decree No 1832, the objectives of the sector will be preserving the available human resources and maintaining the level of technological development achieved by the country in the peaceful use of nuclear energy.

The decision is based on the need to guarantee the continuation of the work accomplished thus far by the CNEA. To achieve this it is essential to conduct several studies and projects to reorganize nuclear activities that will result in the adoption of appropriate measures.

The following have been designated members of the council: Dan Jacobo Beninson, Enrique Mariano, Carlos Martinez Vidal, Roberto Perazzo, Raul Abel Tomas, and Oscar Wortman.

The new council will advise on the preparation of specific programs and conduct annual checks on the results of their implementation. It will also advise on the planning and construction of projects related to the nuclear generation of electricity, in compliance with the guidelines established by the Foreign Ministry.

The council will also make proposals on the status of CNEA personnel with regard to appointments, promotions, transfers, and dismissals. It will also submit proposals on granting scholarships, contracting foreign experts, signing direct research contracts, and adopting measures that will contribute to the training and improvement of personnel.

BRAZIL

Aramar Center To Be Able To Produce Fuel Elements in 1988

51002010a Sao Paulo O ESTADO DE SAO PAULO in Portuguese 21 Nov 87 p 29

[Text] Brazil will be able to produce the fuel elements for its research nuclear reactors as soon as next year at the Aramar Experiment Center, according to an announcement made yesterday in Rio de Janeiro, by Admiral Othon Luiz Pinheiro da Silva in a speech at the Brazilian Center for Strategic Studies. This means that in 1988 the parallel nuclear program will have succeeded in enriching uranium to 20 percent and in producing its own uranium oxide pellets, the fuel element indispensable to the operation of the reactors of IPEN and IEN, both operating precariously since 1976 when Jimmy Carter prohibited the export to Brazil of this material.

Adm Othon Pinheiro, one of those responsible for the parallel nuclear program developed by the National Nuclear Energy Commission (CNEN) and by the Navy, also revealed that orders are now beginning to be placed with Brazilian-based companies for the construction of the first entirely national compact power reactor. This reactor will have 50 thermal MW and, in Pinheiro's words, "be a first cousin of the French Rubi reactor."

He said that the reactor's principal components (vessel, steam generators, pressurizers) are out for bid by companies participating in the parallel program and that the first national reactor will have the unique feature of offering triple protection, i.e., it will be constructed with three containment shells for maximum operating security.

According to Adm Othon Pinheiro, it is not valid to criticize this nuclear program as an absurdity on the grounds that Brazil is a poor country lacking in resources. He argued that the program is being carried out with economies effected by the Armed Forces themselves. The navy alone gave up the importation of two first line ships, "essential for its operations inasmuch as they represented two frigates worth \$200 million each," and assigned the funds entirely to this program, considering it to be in the highest national interest.

"Our comrades in arms," he stressed, "are suffering from these economies, but they bear them because they know this program to be essential for the nation. No society is viable if it sells only raw materials and agricultural products. If we do not incorporate national technology, leaving us only with the production lines of the multinationals, we will be encouraging the repatriation of profits by such devices as underinvoicing, which escape the control of the state; we will not create high-level jobs; we will not train a critical mass of talent and intelligence, which are indispensable factors if Brazil is to cease to be underdeveloped."

In his remarks, Engineer Colonel Alvaro Augusto Alves Pinto, science and technology adviser to the Army, said that there is a great disinterest in the nuclear area on the part of young people as a result of the strong campaign being waged in Brazil to demoralize all national attempts at self-sufficiency. He said that the IME (Military Institute of Engineering) under Pro-Nuclear (Program for Human Resources Training of the Parallel Nuclear Program), which succeeded in graduating 385 specialists at the master's level in the nuclear field between 1977 and the past year, is now completely emptied out.

12942/9738

Navy Said To Have Technology To Build Nuclear Submarine

51002010b Rio de Janeiro O GLOBO in Portuguese 20 Nov 87 p 6

[Text] Brasilia—Brazil is now technologically capable of constructing a nuclear propulsion submarine, the minister of the Navy, Henrique Saboia, stated yesterday after the Flag Day ceremony at the Urban Military Sector in the federal capital. "Those who doubt our capacity to build a warship of this type will be surprised. It is our only military program in the nuclear research area.

Those who think that we are conducting research on a nuclear artifact (atom bomb) are mistaken, since there is no development program in this sense within the Armed Forces."

Henrique Saboia said that all technological obstacles to the construction of a nuclear submarine have been overcome without any external help. He said that after tests at the Ipero pilot plant the submarine will be built with resources from the Navy budget. According to the minister, the nuclear reactor can also be used for the production of electric power. "It is a classic nuclear reactor. It can rotate a propeller on a shaft, as well as produce electricity for a city."

The Brazilian atomic submarine confronted various obstacles in the past. Among these was the prohibition in the administration of Minister Maximiano da Fonseca on the transfer of technology for special nylons by Toshiba of Japan. This material is employed in ultrasilent transmission cases for submarines, although it has an infinity of other applications.

The Department of State of the United States discovered a transfer of this technology to Brazil and requested the intervention of the Japanese Government. From that time to the present, the Military Research Institute (IPoM) has been developing an ultrasilent nylon alloy with its own technology. The alternative of joining an electric motor and generator to the nuclear reactor was studied by IPoM but was not adopted, because the submarine although quieter would be slower and heavier.

12942/9738

JAMAICA

Absence of Legislation on Radiation Exposure Scored

51400002 Kingston *THE DAILY GLEANER* in English
15 Dec 87 p 12

[Text] Jamaica has no legislation to control the levels of radiation which enter the country, the Director of the University of the West Indies Centre for Nuclear Science, Professor Gerald Lalor, said on Friday.

Speaking at the Christmas dinner of the Caribbean Institute of Food, Science and Technology's Jamaica Chapter, he said: "Anybody can bring anything in here...there is no group or body or atomic energy commission here...."

"We don't have any legislation which controls the use of radiation and radio isotopes, or anything to ensure that technicians (who work with radioactive material) are properly protected."

The main danger from exposure to high levels of radiation is cancer.

There is an increasing number of nuclear reactors in the region, in Florida, for example; and in 1991 one will be established in Cuba. "More attention will have to be paid to the establishment of normal environmental levels of radiation here," said Professor Lalor.

The scientist said he believed that there will be an increase in the levels of radiation here what with, among other things, the number of CAT Scanners here.

Professor Lalor said young people were at greater risk than the older persons, as radiation attacks young, growing cells. Recently, the Centre has been doing epidemiological studies of radiation here and have found surprisingly high levels of radiation in some areas of Jamaica.

Turning to the worldwide effects of the Chernobyl disaster on food supplies, Professor Lalor said that the Centre had been analysing all the major imports of foods into Jamaica.

Earlier this year, the Centre had tested over 50 samples of tinned foodstuff, cereals and fish imports from Europe for traces of radiation. The samples were sent from the Storage and Infestation Division of the Ministry of Industry and Commerce and the Bureau of Standards.

Professor Lalor said the population needed to learn more about radiation and what was going on here in this sphere.

He also praised the work of the Institute which, he said, provided a focal point where people of like minds could gather.

In her report, the Chapter's President, Carmen Alexander, said that next August they will be the second regional conference with the theme being: "Meeting the challenges in the food industry."

/9604

BANGLADESH

Ershad Chairs Meeting To Discuss Nuclear Power

51500076 Dhaka THE BANGLADESH OBSERVER in English 18 Dec 87 pp 1, 12

[Text] The high-level Rooppur Atomic Power Plant Project Implementation Committee, headed by President Hussain Mohammad Ershad reviewed the progress of work for materialising the ambitious power project at its third meeting in Dhaka on Thursday, reports BSS.

President Ershad, who chaired the meeting which is the third since March, took stock of the progress of work assigned to the Technical Committee and expressed his happiness at the outcome.

Upon a directive of the President, feasibility study of the plant, conceived to be of the size between 300 and 500 megawatts was taken up in October this year covering three basic aspects of technology section, cost economy and financing. The feasibility study will be completed by the third week of March next year.

The feasibility study will be followed by finalisation of the cost economy of the project.

Briefing about the meeting, the Member-Secretary of the Committee and Chairman, Bangladesh Atomic Energy Commission Dr Anwar Hossain said under the direct initiative of the President, schedules for preparation of the project have been set in a manner so that the actual implementation of the prestigious and high-tech project can start by early 1989. The implementation phase will take five years.

He said while preparing the project, utmost attention has been given to the safety, fuel and waste disposal of the plant.

The meeting in the course of discussing different aspects of the plant including its finance and type of technology to be used, recommended for examining the possibility of joint venture with expatriate partner for easy access to funding and technology. It, however, decided that the majority of the shares will be kept with Bangladesh.

The meeting set up a five-member Sub-Committee to look into the matter and asked the Sub-Committee to submit its report at the earliest to the main committee.

President Ershad also expressed his satisfaction over the report by the Bangladesh Atomic Energy Commission on the collaboration of International Atomic Energy Commission, which offered Bangladesh to finalise the feasibility report and identify the finance sources in the implementation of the power plant.

Dhaka To Study Small Reactor

The meeting also decided that Bangladesh will join International Atomic Energy Commission's study on small and medium-sized Atomic reactor to meet the demand of future power requirement.

It stressed real transfer of technology with regard to generation of power by Atomic Energy and ensuring use of indigenous supplies and manufacturing capabilities as far as possible under the technology in the implementation of the Atomic power plant.

Committee members and Minister for Energy and Mineral Resources Anwar Hossain, Finance Minister M. Syeduzzaman, Planning Minister A.K. Khandker, Principal Secretary at the president's Secretariat A.H.F.K. Sadeq concerned Secretaries to the government and Chairman, Bangladesh Atomic Energy Commission attended the meeting.

The Rooppur atomic power plant project was first conceived in 1961 and the site was selected at Rooppur, 16 miles east of Pabna town. But after completing primary infrastructure work, the project went into cold storage and nothing tangible was done till last year when President Ershad directed the Bangladesh Atomic Energy Commission to take up the project in right earnest for implementation.

The President, during his visit to some industrially advanced countries picked up the matter of implementation of Rooppur atomic power plant with the leaders of those countries and impressed upon them the urgent need of the plant to meet the growing demand for power at home.

Following that President Ershad, after giving the Jamuna multipurpose bridge project linking the eastern and western regions of the country a final shape for implementation, engaged his efforts for the implementation of the Rooppur atomic power plant project.

07310

Press Release on Radiation Level in Imported Milk

51500077 Dhaka THE BANGLADESH OBSERVER in English 18 Dec 87 p 3

[Text] The level of radiation in the milk now being used in preparing sweet meats, curd, and ice creams in the country was found to be very low, a Bangladesh Atomic Energy Commission Press release said in Dhaka on Thursday, reports BSS.

The Press release said, the BAEC has continuing its tests on radiation in imported milk and foodgrains since the Chernobyl accident and there is no reason for the consumers to be panicked.

A section of newspaper carried reports recently that sweets, curd, ice creams and other food items were being prepared in the country with imported milk with harmful level of radiation, the Press release mentioned.

07310

Nuclear Power Engineer, Former AEC Member, Dies

51500075 Dhaka THE BANGLADESH OBSERVER in English 1 Dec 87 p 6

[Text] Mr Mohammed Anisur Rahman, an expert in nuclear power engineering and former member of Bangladesh Atomic Energy Commission, died of hodgkins disease at his West Rajabazar residence on Monday, afternoon, reports BSS.

He was 60.

Born in Godagari, Rajshahi, Mr Rahman also served as an adviser on atomic energy of the Libyan Government from 1982 to 1986.

He left behind his wife, three sons, one daughter and a host of relations and friends to mourn his death.

His namaz-e-Janaza will be held after Zohr prayer today (Tuesday) at West Rajabazar Jame Masjid and he will be buried at Banani graveyard.

07310

EGYPT

Nuclear Fuel Unit To Begin Production

51004602a Cairo AL-AHRAM AL-DUWALI 29 Dec 87 p 9

[Article by 'Abbas Mabruk]

[Excerpt] This year, Atomic Energy Authority experts under the supervision of Dr Hamid Rushdi al-Qadi, chairman of the authority, have carried out a large number of important achievements in peaceful nuclear areas, the most important of which was the project to develop the nuclear research reactor, start the construction of the nuclear fuel plant on the basis of recommendations by Eng Mahir Abazah, the minister of electricity and energy, and work on the final stages in the radioactive waste plant in Inshas, in cooperation with the International Atomic Energy Agency, as well as completing the installation of the largest electronic accelerator in the Middle East, which will be inaugurated during the new year. The authority in 1987 also performed intensive efforts, as Dr Hamid Rushdi asserts, to protect the country from the entry of foodstuffs contaminated with radiation, since examinations took place on more than 60,000 samples representing close to 14,000 shipments.

Dr Taymur Kamal, vice chairman of the authority, states that in the context of the development of the first research reactor in Inshas, the authority's experts finished maintenance on the reactor in order to put it back in operation; the Russian control system was replaced by other Western systems and the reactor was supplied with all prevention and early warning systems in the case of the occurrence of any breakdown. The maintenance process is considered a beginning in raising the reactor's capacities from 2 to 5 megawatts in the new 5-year plan at costs totalling 8 million pounds.

Dr Ibrahim al-Dakhili, professor at the Nuclear Research Center, says that work has been intensified in preparing the nuclear fuel unit in Inshas for operation, since the equipment related to the unit is being installed for the start of its operation next year to produce fuel on the quasi-industrial level, and then in the area of industrial production, with the goal of self-reliance, so that recourse will not be made to importing fuel from abroad when nuclear plants are built to produce electricity in Egypt.

At the radioactive waste treatment center and the hot plant, work is taking place in the final stages on the most massive project in the Middle East for the treatment of low- and medium-level liquid radioactive waste and its safe removal in cooperation with the International Atomic Energy Agency. This stage, which has cost more than 12 million pounds and will end in the new year, as Dr Hisham Fu'ad, chairman of the center, says, is the first plant. The second plant is to treat solid wastes, in cooperation with the international agency. The first stage will treat 10 cubic meters of liquids contaminated by low-level radiation and 2 cubic meters of medium-level liquids a day. In addition a large nuclear incinerator will belong to the center which will be able to burn 5 tons of radioactive wastes a day and the construction of a unit to eliminate radioactive contamination will take place.

In the new year the National Center for Radiation Research and Technology will witness a new practical, industrial leap forward, since the industrial electronic plant will be inaugurated, costing more than 5 million pounds, in cooperation with the United Nations. Dr Ahmad al-Maliji, chairman of the center, asserts that 1987 represents the end of the third construction stage of the center; this is considered the stage of the transfer and application of gamma radiation technology and the completion of the necessary equipment for starting the introduction of electronic radiation. This includes the setting out of the price policy for radiation and analysis services. The powerful electricity plant in the center has been completed, along with the workshop building, and the quasi-industrial units, such as fabric, rubber, plastic, food and grain treatment, structures and equipment are close to completion.

11887

INDIA

Rajiv: India Will Make Nuclear Bomb If Forced
51500073 *Calcutta THE TELEGRAPH in English*
29 Nov 87 p 1

[Excerpt] Agartala, Nov. 28. The Prime Minister, Mr Rajiv Gandhi, today made it clear that India would not hesitate to make a nuclear bomb if compelled to do so for security reasons.

Mr Gandhi, who arrived here this morning on a one-day pre-election tour of the state, told newsmen at the airport that if Pakistan continues to go ahead with its nuclear weapons programme, "India will not hesitate to go nuclear though it will be a retrograde step for us." However, he hoped that Pakistan as a neighbouring and friendly country would desist from manufacturing the bomb.

(According to UNI, the Prime Minister also said he would enquire "whether Pakistan was building a 10-km defence channel with American surveillance equipment in the international border in Jammu region.")

08309

Gandhi Rules Out Nuclear Treaty With Pakistan
51500071 *Calcutta THE TELEGRAPH in English*
18 Nov 87 p 4

[Excerpt] New Delhi, Nov. 17 (PTI). The Prime Minister, Mr Rajiv Gandhi, today ruled out signing of a nuclear non-proliferation treaty with Pakistan and said, "We have to get away from the red herring that the solution to nuclear proliferation lay in the bilateral treaty."

"No bilateral treaty can protect us from the intercontinental ballistic missiles (ICBM) and intermediate range ballistic missiles (IRBM)," the Prime Minister said while addressing officers undergoing a course at the National Defence College here.

He said nuclear weapons were positioned everywhere—"in our neighbourhood, in the north and in the Indian Ocean"—and added that a bilateral approach would amount to a "fairytale."

Mr Gandhi emphasised that a piecemeal, zonal or regional approach would not help tackle the nuclear issue, which was essentially a global matter. He also ruled out India signing the nuclear non-proliferation treaty. "NPT is unacceptable because it is discriminatory and partisan," he said.

The Prime Minister, who took the opportunity to give a detailed exposition of India's nuclear policy, said there was no logic "which compels us to ever signing the NPT."

Mr Gandhi said India was the only country in the world which had proved its technological capacity to make a nuclear weapon and had yet deliberately refrained from producing one. "We have shown both the capacity and the will to restrain ourselves for more than 13 years," he said.

While India had restrained itself from transferring its technological capacity into an active system, Pakistan was continuing its "clandestine efforts" to acquire nuclear weapons. Pakistan, he said, had an active nuclear weapons programme but we are maintaining a course based on principles and ideologies.

Referring to the forthcoming visit of the Soviet leader, Mr Mikhail Gorbachev, to Washington, Mr Gandhi said, "If the reported snags are removed and the treaty is signed, it will lead to dismantling of the land-based short-range and medium-range missiles.

"It would be a historic first. For the first time since invention of the nuclear weapons disarmament, in the sense of dismantling nuclear system, will be taking place," he said.

However, he cautioned that while the significance of the proposed meeting between Mr Gorbachev and the US president Mr Ronald Reagan, should not be underrated, it should not be overrated either as their agreement would cover only 3.3 per cent of the nuclear warheads in existence. Besides, the other three nuclear weapon powers—France, Britain and China—are not involved in the agreement.

08309

Pakistan Nuclear Program, INF Treaty Viewed
51004717 *Delhi THE HINDUSTAN TIMES in English*
18 Dec 87 p 11

[Article by R. R. Subramanian: "Time To Call Pak Bluff"]

[Text] Indo-U.S. relations appeared to have collapsed once again when the U.S. Senate Appropriation Committee made the decision to link the transfer of "high technology" to Indian acceptance of international safeguards on its nuclear programme. It even blamed India for Pakistan wanting to go nuclear. Fortunately, the U.S. Senate has turned down the committee's decision and paved the way for transfer of "high technology" to India.

The Senate has, however, granted a six-year waiver for the Symington-Glenn Amendments to the Foreign Assistance Act, in the case of Pakistan which can continue to receive \$4.02 [as published] in military and economic assistance in spite of its clandestine nuclear weapons programme.

Pakistan's role as a conduit for supplying arms to the Mujahidin in Afghanistan has once again come to its rescue, even as reports are coming in to suggest that there is a second enrichment plant at Golra, some 15 kms southwest of Islamabad.

In April 1979 President Carter had used the Symington-Glenn Amendments to deny a mere \$40 million to Pakistan, on the basis of information that at Kahuta, Pakistan was constructing an unsafeguarded enrichment plant. The Reagan Administration has adopted quite the opposite posture and like it did in 1981, it has put the containment of the Soviets in Afghanistan as priority number one.

Even the recently concluded U.S.-Soviet Summit in Washington has not been able to set a time-table for withdrawal of Soviet troops from Afghanistan. Although there is accommodation on arms control issues between the two superpowers, on regional conflicts there has been no understanding so far.

Gorbachev's policies of perestroika, glasnost and demokratsia put greater emphasis on economic development than on military buildup. For this reason it favours withdrawal of troops from Afghanistan. But the point of contention between Washington and Moscow is the nature of the regime that should exist in Kabul.

Dr Shirin Tahir Kheli, who serves on President Reagan's National Security Council, is an American citizen of Pakistani descent. During her recent visit to New Delhi she had observed that Afghan guerrillas were doing well and hence the U.S. was committed to helping them. It follows, therefore, by inference, that Washington needs to sustain the Pakistani military; this in spite of the fact that Islamabad refused to allow its military forces stationed in Saudi Arabia to fight Iran, Washington's arch enemy. Pakistan's dexterity in manipulating Washington's Congressmen in spite of all its inherent contradictions is a testimony to its diplomacy.

A week before the U.S. Senate Committee made its decision, Dr Mahbulul Haq, Planning Minister of Pakistan, had indicated that he would visit the Soviet Union to seek \$4 bn worth of economic aid. This employment of the 'Soviet card' by Ziaul Haq paid off. Simultaneously he has been able to procure as many as 800 tanks from the Chinese.

President Zia has achieved diplomatic successes in spite of its clandestine nuclear weapons programme. If the centrifuge enrichment plant at Golra also begins to produce enriched uranium, Pakistan would be able to stockpile weapons grade material without actually testing any one of them. Pakistan's brilliant metallurgist A. Q. Khan, who heads Project 706 at Kahuta, has sought to make enrichment technology the issue over which India has been beaten. If India were to upgrade her pilot centrifuge plant for enriching uranium, then she could match Pakistan's.

India's nuclear programme needs to demonstrate coherence, and, at the policy level the time has come to cast away outmoded ideas and make serious decisions on how to deal with several of the American decision-making institutions that have turned a blind eye towards Pakistani attempts to procure nuclear weapons and China's role in it. It is no use merely attempting to decouple Pakistan from China.

Steps have to be taken in the 1990's to translate attempts to fruitful action. One such attempt should be to call the bluff in Pakistan's nuclear diplomacy and not allow it to create the impression in the U.S. Senate and Administration that its nuclear programme is one that is merely in response to that of India. In fact, India has not taken steps to embark towards nuclear weapons after its detonation of a peaceful nuclear explosion (PNE) in May 1974.

As early as 1965, Homi Bhabha had conceived the subterranean nuclear excavation project (SNEP) but this came to fruition as a nuclear explosion in May 1974. Since then China has deployed scores of missiles. Whilst the Pakistani bomb has become a major issue, the Chinese missiles stationed at Golmo, Nagchu and Amdohe in the Tibet Autonomous Region bordering the Qinghai Province have not generated concern. The Indian Space Research Organisation (ISRO) can fire rockets that have a punch potential equal to the best of Chinese military missiles.

Yet there is an asymmetric situation till now. The negotiations that have taken place between New Delhi and Beijing have ignored these missiles. The removal of the 171 SS-20 missiles targeted on the East Asia theatre as part of the INF accord would ease Chinese targeting difficulties, and Vietnam and India need to be concerned therefore.

India under Nehru was the champion of nuclear disarmament and his idealism has today borne fruit, albeit marginally. But in the global power calculus, it is China and not India that is in the driver's seat. A clarity of purpose from the part of India would set the stage wherein stale ideas could be given up and new directions of diplomacy could emerge so as to match Pakistan's propaganda ploys.

/9274

Launch Vehicle Engine Tested Successfully
46001115d Bombay THE TIMES OF INDIA in English
3 Nov 87 p 19

[Text] Nagercoil (Tamil Nadu), November 2 (PTI)—The first static hot test of the Polar Satellite Launch Vehicle's (PSLV) second stage liquid-propellant rocket engine was conducted successfully on Saturday at the Liquid Propulsion System Centre (LPSC) at Mahendragiri near here in Kanyakumari district.

The performance of the full scale rocket engine during the 20-second test and the parameters obtained from the test recordings were as expected.

The LPSC director, Dr A.E. Muthunayagam, observed on the occasion that the LPSC had crossed one more milestone in the PSLV programme with the successful conducting of this test.

Commending the efforts of the project scientists and engineers which made this possible, he said how the day of the test also reminded of the late Prime Minister, Mrs Indira Gandhi's commitment to space research and technology.

/06091

AEC Issued Notice on Periyar River Contamination

51500074 *Bombay THE TIMES OF INDIA in English*
2 Dec 87 P 1

[Text] New Delhi, December 1. The supreme court yesterday issued notice to the secretary to the Atomic Energy Commission on a letter since treated as a writ petition which alleged massive contamination of the Periyar river in Kerala.

The contamination was allegedly due to the discharge of radio-active waste and thorium hydroxide by the Indian Rare Earths Limited in Alwaye.

Mr Justice Ranganath Misra and Mr Justice M.N. Venkatachaliah asked the Union of India to submit its reply within four weeks on the allegations levelled in the writ petition by Prof Ahmed Poojan Siddiqui, of Jodhpur University.

Mr Siddiqui recently sent a letter annexed with a newspaper clipping to the court alleging contamination of the river and sought directions to the government to immediately stop injurious discharge in the river.

After the government submits its reply, the court will decide about the steps required for making the river contamination-free.

Call for Visit

Mr Siddiqui has urged the court to depute a team of environmentalists and concerned citizens to visit the site and assess the damage being caused to the river and make suggestions for the safety of residents of the area, including the employees of IREL.

The petitioner said a medical survey on IREL workers disclosed that the incidence of cancer among them was abnormally high and that 11 people died of it and seven suffered genital disorders.

While seeking repeal of Section 18 of the Atomic Energy Act, 1962, which empowers the commission to withhold any information connected with nuclear energy, the petitioner said such a section was violative of Articles 19 and 21 of the constitution.

If the "things" in the IREL were allowed to continue, it would drastically affect the government's long-term and multi-dimensional programme of peaceful uses of nuclear energy. The petitioner added that lakhs of people using the river water for various purposes were exposed to the hazards of nuclear radiation.

According to the petitioner, at least 1,500 kg of thorium hydroxide and 15 kg of uranium were discharged into the river annually by the IREL. Between 1962 and 1970, the IREL dumped a substantial amount of radio-active material at the sea side of the river in Ernakulam which is the centre of fishing activity.

However, there were about 5,000 RCC barrels containing thorium hydroxide of radioactive material stored in a silo in the IREL complex. According to the petition, the silo has also developed cracks and if it collapses the entire radio-active charged material will mix with the river waters.

08309

Delay in Nuclear-Power Plant Commissioning Regretted

51500072 *New Delhi PATRIOT in English*
27 Nov 87 p 5

[Text] Union Minister of State for Science and Technology K.R. Narayanan on Thursday regretted in the Rajya Sabha, the "inordinate delay" in the commissioning of the Narora atomic power plant in Uttar Pradesh, costs of which had now escalated to Rs 533 crore, reports PTI.

Most of this delay is valid, because Indian scientists want to incorporate all possible new technology for making the atomic power plant absolutely safe in the context of the recent nuclear accidents abroad, Mr Narayanan said. He said this had to be developed indigenously and could not be acquired from another country.

The original estimate for Narora was Rs 210 crore which was subsequently raised to Rs 399 crore and now the revised estimate stood at Rs 533 crore, he said, answering supplementaries during question hour.

Mr Narayanan said problems faced in land acquisition, delay in finalisation of design, due to uncertainties regarding availability of cooling water, seismic requirements and delays in delivery of major equipment such as steam generators and endshields, were the main factors for slippages in the project.

He said the UP Government had first assured that it would maintain clean water supply from Ganga canal but had later gone back on it. The scientists had to, therefore, opt for a closed loop system for the cooling tower involving high technology.

Since the power plant was in a seismic belt, scientists had to develop anti-earthquake technology to provide greater safety to the power plant, he said.

Mr Narayanan said special types of steam generators were required for the project. For the BHEL project on which the orders were placed, it was altogether new technology which they had to develop, he said.

08309

PAKISTAN

U.S. Bilateral View of Nuclear Issues Assailed 03311458 Karachi DAWN in English 15 Dec 87 p 7

[Editorial: "U.S. Aid and Pakistan's Options"]

[Text] The report that the American Senate and House of Representatives have cleared Pakistan's 4.02-billion-dollar aid package will be well received in this country. This is not so much because there is a broad national consensus on the primacy of US economic and military aid in the context of Pakistan's economic development and security concerns as such. The real reason is the principle involved that made it so important for Pakistan that aid should be restored. The American Congress had voted a 105-day suspension of aid in August on a suspicion that the Pakistan Government was involved in the attempted import of some strategic nuclear material from the US by a Canadian of Pakistani origin. Islamabad's atomic energy programme had become suspect in the American eyes because of this incident. By voting for the aid package now, Congress has cleared Pakistan of the charges levelled against it in the nuclear proliferation context. Moreover, some of the one-sided proposals being considered earlier in the Senate and the House committees—these would have required Pakistan to open its nuclear facilities to international inspection—have now been dropped. This vindicates Pakistan's peaceful nuclear programme which, as the Government has repeatedly affirmed, has no military dimension. But by dropping the Appropriations Committee's recommendation that a regional approach be adopted towards non-proliferation, the Senate has once again confirmed its policy of taking a bilateral view of nuclear issues in its dealings with the countries of South Asia. By not equating India and Pakistan in matters of aid and international safeguards for nuclear facilities, the latest Senate action in effect perpetuates the discriminatory approach adopted by the US towards the nuclear policies of Pakistan and India. This is palpably unfair. While aspersions have been cast on Pakistan and moves have been suggested requiring Islamabad to prove its nuclear innocence, others on the atomic threshold such as India,

South Africa, Israel and Brazil, to name only a few, have received American assistance without any restrictions or a qualification of good conduct. How is it, one wonders, that these favoured ones are treated differently and have not been asked to place their nuclear facilities under international safeguards? They have enjoyed extraordinary freedom in planning and implementing their nuclear programmes without any checks being demanded. There is hardly any surprise then if Pakistan has come to resent this dichotomy in the US approach.

Now that aid is to be restored, it is important that Pakistan immediately undertake contingency planning to prepare for a possible cessation of American aid once again in the future. This eventuality cannot be ruled out. The Senate resolution provides for a six-year waiver to the Symington Amendment in Pakistan's case. The House of Representatives resolution recommends a two-year waiver. Additionally, the American President is required to certify to Congress that Pakistan is not producing highly enriched uranium or separated plutonium. How the disparate provisions of the two Bills are going to be integrated into the final act of legislation will determine its operational effect. But it is evident that Pakistan's nuclear programme can at any time be made the pretext for suspension of aid. Moreover, Senators and Congressmen have unequivocally linked aid to Pakistan with the situation in Afghanistan. They have made it clear that it is in America's interest that Pakistan is given aid to enable it to continue to play its role vis-a-vis the resistance in Afghanistan. We should be prepared for a situation when American aid to Pakistan could be cut off because of a qualitative change in the geostrategic environment of the region.

It would be wiser for Islamabad to plan for such an eventuality now that the resumption of aid has lifted the veil of uncertainty. Our policy planners can now freely explore several options without feeling weighed down by any severe constraint. Those who put on a brave face when aid is suspended and declare that Pakistan can survive without American assistance would do well to concentrate on our economic realities. Pakistan's debt burden has reached such enormous proportions that debt servicing alone consumes as much as 88 percent of the aid inflow. In the case of the United States, net transfer from the other side amounts to even less than 12 percent. If aid is halted, the country will lose not only this net inflow but will be required to pay massive amounts towards debt servicing from its own resources, assuming that it does not plan to default. Pakistan's dependence on foreign aid is such that in 1986-87 nearly 33 percent of its budget deficit was met by external financing. Sound economic planning demands that the Government work out a strategy which will progressively reduce dependence on foreign aid, especially American assistance. We should not underrate the urgency of this, for otherwise our foreign policy and energy options will remain unacceptably tied to the very many restraints and limitations imposed by aid-givers, the US or any other.

Besides, is it prudent or sensible to overlook the long-term prospects of an economy kept going by heavy doses of borrowed money?

Austria To Assist Nuclear Power Development

51004714 Lahore THE PAKISTAN TIMES in English
26 Nov 87 pp 1, 8

[Article by Iqbal Mirza: "Pakistan has Right to Acquire N-Technology: Austria To Help Set Up Power Plants; Afghan Problem May Be Resolved Soon—Waldheim"]

[Text] Karachi, Nov 25: Dr Kurt Waldheim, President of Austria, disclosed here today that Austria will help Pakistan set up power plants in the country.

Addressing a press conference at the Governor's House prior to his departure here this afternoon, Dr Waldheim said that basic agreement has been reached between the two countries for the establishment of power plants to meet the growing energy requirements in Pakistan. He said that Austria possessed specialisation in this field and its advanced technology in the field power plants would be helpful to the country.

Besides this, he said opportunities existed in several areas, where Austria could help Pakistan attain its goals. He particularly identified electronics, steel and scientific fields, especially medicine, where his country would be willing to cooperate.

Dr Waldheim said that the fruitful discussions held with President General Zia-ul-Haq and Prime Minister Mohammad Khan Junejo would help promote bilateral relations between the two countries and open up areas for cooperation in various fields of economic, industrial, educational and cultural activity.

He said: "We intend to continue this effort" and send a delegation from Austria early next year to work out details for closer cooperation in these fields.

Regarding Afghanistan, Waldheim said that he had extensive discussions on this subject with the President and the Prime Minister and expressed the hope that a solution may be found to the problem in not too distant a future.

Waldheim said that the United Nations trying hard to work out a plan which could bring an end to this problem. He said that a lot of ground has already been covered and the remaining differences are in the process to be overcome shortly.

The important point is the establishment of future government in Afghanistan which, he said, would to a very large extent depend on the tribal leaders and the people of Afghanistan, who will decide as to what type of Government, they would like to have their country.

Replying to another question, he said that Austria was in favour of the establishment of a nuclear free zone, because it would lead to the reduction of tensions in the world.

He said Austria believed that countries have a right to put up atomic plants and use atomic energy keeping in view their best national interests. But, such plants, he said should be controlled and atomic energy should be used for peaceful purposes, only.

Dr. Waldheim said that he was in favour of countries joining the nuclear non-proliferation treaty, because that will remove doubts about misuse of atomic energy.

APP adds:

Dr Kurt Waldheim said here today that every country has the right to acquire nuclear technology for "peaceful purposes."

Addressing a press conference at the Governor's House on the conclusion of his 3-day visit to Pakistan, before his departure to Frankfurt, Waldheim said it holds good for Pakistan also, as it was presently experiencing an 'energy crisis'.

Replying to a question about the acquisition of nuclear technology by Pakistan, Waldheim said it has the right to use the nuclear technology for its development and peaceful purposes.

However, he said the international community feels that there should be non-proliferation of the nuclear weapons.

The Austrian President hoped that the international community would continue to respect the non-proliferation treaty.

Waldheim felt that the nuclear plants, however, should be controlled, so that it should not pose any security problems.

There was no harm, if the nuclear technology was used for peaceful purposes, he said.

He also said that his country also favours establishment of nuclear free zones.

Waldheim said the convening of the U.N. sponsored international conference on Middle East may not be possible in the near future, because of the differences in the Israeli Government on the issue.

He said, during his discussions with President General Mohammad Zia-ul-Haq and Prime Minister Mohammad Khan Junejo, they agreed that such a conference does not look like convening in the near future, because it will not be possible, since the participation of the Israel is not assured. There are differences of opinion in the

Israeli Government and it does not look possible that such a conference can be convened in the near future. We agreed that unless the differences are resolved, such a conference can not be convened.

Dr. Waldheim said that he hoped a solution to the Middle East is found early.

Regarding his talks with President Zia and Prime Minister Junejo about East-West detente, he said that it had made progress in the field of international relations. We have come to the conclusion that some of the outstanding political issues, disarmament and regional conflicts have better chances of solutions. In the international economic field, they agreed that it could not be expected to become a crisis, as the world had witnessed in 1930s.

Today, there are better communications, which enable us to find solutions to various problems. However, we have to be careful, as negative signs do exist, but these outstanding problems can be overcome, he added.

Regarding Iran-Iraq war, he said there appears to be no likely solution to the problem in near future.

To another question on his alleged involvement in war crimes against Jews in the Second World War, Waldheim said "some allegations were made, but it turned out that these allegations were unfounded." It has no impact on my visits to foreign countries. This is my third visit to a foreign country and I find no impact anywhere," he remarked.

/09599

Nation's Nuclear Policy Defended

51004709 Lahore THE PAKISTAN TIMES in English
16 Nov 87 p 6

[Article by M.I. Lashkar: "Nuclear Issues: Enough Is Enough"]

[Text] Prime Minister Mohammad Khan Junejo's remarks on US Congress's attitude towards Pakistan's nuclear programme made recently were only a reiteration of its well-known policy on the subject. The Prime Minister's statement has not only removed doubts about Pakistan's determination to continue with its nuclear policy despite pressures from external sources, but has also come as a reminder that Pakistan, as a sovereign and self-respecting country, cannot and would not compromise on principles. In fact, such a statement by the head of the country's political government was a necessity in the present circumstances when doubts are being expressed in certain quarters that Pakistan might succumb to nuclear blackmailing in the face of the pressures which are direct on its economy.

The Prime Minister's remarks came in his interview with "Washington Post." In the interview, he said, it is not possible for his Government to give any further assurances to the United States on its nuclear programme as a mean of overcoming obstacles to continued US assistance to Pakistan. He said: "We gave commitments at an earlier stage and as an elected government, I will only go further to the extent that India is also included in the nuclear proliferation issue. It must be made clear that Pakistan cannot be singled out on this issue."

These remarks of the Prime Minister explain both the genesis and the rationale of Pakistan's entire nuclear policy. Obviously, the Prime Minister was referring to the assurances sought by the US Congress that Pakistan is not making nuclear weapons. Pakistan gave this assurance since the inception of its nuclear programme through all normally available diplomatic and other channels. But there is a lobby in the US Congress which, under Indian and Jewish pressures, is seeking further assurances to the extent of opening Pakistan's nuclear installations to physical verification. Such a proposal or pressure, coming it may from whatever sources, not only smacks of ill will, but is also tantamount to direct interference in the internal affairs of a sovereign country. That is what Pakistan cannot allow to be done and that is what was expressed in clear terms in the remarks of the Prime Minister. The fact is that Pakistan has shown enough leniency and that is because of its sincerity of purpose in its nuclear programme. But that should not be considered as a weakness and as such Pakistan should not be made to succumb to nuclear blackmail. To this point, enough is enough and Pakistan cannot go beyond that.

There is nothing secret about Pakistan's nuclear policy. Pakistan's nuclear programme is peaceful from the very beginning. But it has been maligned by events which have been the makings of others. The most ironical situation about it emanated from the fact that it was India which exploded a nuclear bomb and it is Pakistan which has been suffering for this since then. It was after the Indian explosion that the question of nuclear proliferation in South Asia became dominant in international relations and it was Pakistan which was made a scapegoat. As a precaution against nuclear proliferation, Canada was the first to act by stopping supply of nuclear fuels for Pakistan's nuclear energy plant. Then, it was due to the intense lobbying by the anti-Pakistan circles that the then American Administration stopped giving aid to Pakistan in 1979 on the pretext that Pakistan was developing a uranium fission facility at Kahuta for the purpose of making nuclear weapons. It was also under the pressure of the then American Administration that France also backed out of its agreement to supply a Nuclear Reprocessing Plant to Pakistan.

Two years later in 1981, however, the American Congress gave approval to an over 3 billion dollars 5-year US aid package for Pakistan by granting a waiver to the Symington Amendment, a law which prohibits US aid to

any country which is developing nuclear facility without safeguards under the Nuclear Non-Proliferation Treaty (NPT). It is generally believed that the waiver was granted then because of the American interests which were incidentally served by Pakistan's Afghan policy framed and followed after the Soviet military intervention in Afghanistan. But there is definitely indication that while doing so, the Congress was convinced that Pakistan's nuclear programme is not lethal.

And now the same Congress is again playing with the lethal concept of Pakistan's nuclear programme. The issue was raised again when the post-87 follow-up US aid package of over 4 billion dollars came before the US Congress earlier this year. Even when the aid was being negotiated, the anti-Pakistan lobby was at work and pressure was mounting on Pakistan to sign the NPT. The pressure was at its peak when the former US Ambassador in Pakistan Mr. Deane R. Hinton made an elaborate speech at an Islamabad forum saying that there was little hope that US Congress would give approval to the post-87 US aid package for Pakistan unless the latter sign the NPT. Pakistan faced the pressure boldly and continued its efforts to drive its point home at the Administration and Congress levels in the US which bore fruit for the moment at that time. At the initial stage of the US Congress handling of the issue, a sub-committee approved first year's aid out of the 5-year post-87 package with the provision of yearly endorsement of the remaining years on American Administration's assurance that Pakistan's nuclear programme continues to be peaceful.

That is where the matter would have ended. But at a later stage, another committee of the Congress recommended deferring of the implementation of the aid deal till new assurances are available to the effect that Pakistan's nuclear programme is peaceful. The aid was to begin from October 1 last and as a result of this recommendation, it was deferred. The recommendation came following a case in which a Pakistani-born Canadian national Arshad Pervaiz was arrested on charge of ordering export of a special type of steel from the United States to Pakistan. The steel is used, among other things, in the nuclear plants. Pakistan made it clear that it is not involved in the Arshad Pervaiz case, as if it needed the steel at all, it could obtain it through other normal channels.

This should and would have satisfied the American Congress and the Administration. But the anti-Pakistan lobbies are dragging the matter further beyond the normal requirements of assurances. On the one hand, they are pressing Pakistan to throw its nuclear facilities open to inspection and on the other they are insisting that Pakistan should sign the NPT. But as a sovereign country, Pakistan cannot do both. It has, however, offered to comply, provided that the restrictions which are sought to be imposed on Pakistan should also be equally applied on India. India has already exploded a nuclear bomb, while Pakistan is only being suspected to be working

towards making one. With such a comparative situation, should not they be placed at the same plank, even if Pakistan's assertion that its nuclear programme is peaceful is dismissed? If Pakistan is pressed to sign the NPT, should not India be asked to do so? The answer must be yes, by all standards. And that is what Pakistan has been suggesting all along, while on its own Pakistan has suggested various measures to India for keeping the region out of nuclear proliferation. If India does not sign NPT, why should Pakistan sign it? Because Pakistan is weak or because Pakistan needs US aid? But there is another side of the story and this is that Pakistan is a sovereign state and it cannot accept any restrictions, no matter if they come from international forums, without having a simultaneous bearing on India which is already a declared nuclear power. Similarly, if Pakistan's nuclear facilities are to be made open to international inspection, why not the Indian facilities to be done so? If the whole issue revolves round the purpose that the region should be made free of nuclear proliferation, restrictions on Pakistan alone could not serve the purpose. To achieve the objective, similar restrictions on India are a must.

With such a background of the whole issue in which Pakistan is being subjected to discrimination, Pakistan cannot go beyond the assurances already given in more than one way and on more than one occasion that its nuclear programme is peaceful. That is what was reflected in the remarks of the Prime Minister in his interview with the "Washington Post" and that should remove all doubts once for all, about Pakistan's nuclear policy vis-a-vis the current pressures on it.

/06662

A. Q. Khan Interview: Journalist Reiterates Position

51004718 Calcutta SUNDAY in English
20-26 Dec 87 p 49

[Article by Kuldip Nayar in the "On the Line" column]

[Text] For a journalist his credibility is vital, for that alone can earn him the respect of his readers. So it is gratifying that a third party as vindicated my report on the interview I had with A. Q. Khan, the Pakistan nuclear scientist. He had virtually admitted to me that Pakistan had produced the bomb and subsequently went back on the statement and even denied the interview which, he insisted, was a social call.

The Press Council of Britain, which Dr Khan approached to damage my professional reputation, has upheld my case. The Press Council's verdict is: "It is agreed by the parties that a meeting and conversation took place between the complainant, Dr A. Q. Khan, and the writer of the article, Kuldip Nayar. Dr Khan strongly denies quotations attributed to him and the interview

reported in the article. On the evidence before it, however, the Press Council has not been satisfied that the interview did not take place or that the quotations were untrue...."

It was Mushahid Mussain, then editor of the MUSLIM, who arranged the interview. It was on account of that, and for subsequently corroborating my story, that he lost his job. And he had the courage to tell the HERALD, a monthly published from Karachi, after Dr Khan had complained to the British Press Council: "The interview was pre-arranged and the scientist himself was eager to meet the visiting journalist. When I told Dr Khan about Kuldeep, he seemed keen to see him. He asked me to call next day at 11 am for confirmation of the interview. The meeting was set for 6 pm. Dr Khan knew very well whom he was meeting. There was no mention of whether the discussion was off the record or not."

I can understand why Dr Khan had to go back on what he said. He was under great pressure to recant. The interview appeared on the eve of the U.S. Congress subcommittee's hearings on Pakistan's new aid package of \$4.2 billion. Normally the interview, given on 28 January, would have appeared long before the day of its publication, 28 February. But I could not help the delay, for the OBSERVER, London, was quite fussy about checking the authenticity of the report and that took time.

That was the time when the Indian forces were arrayed on the Pakistan border. It was a usual military exercise—Operation Brasstacks—but Islamabad was quite worried. My queries in the last few months confirm my earlier guess that the interview was given after Dr Khan got it cleared by the chairman of the Interservices Intelligence wing and later checked it with General Zia. Prime Minister Mohammed Khan Junejo, who was not in the picture, created a hullabaloo and made the Pakistan government instruct Dr Khan to deny what he had said. What made the Jamiat-i-Islami and other political parties which went to town on the failure of security so angry was that a person from "an enemy country" had been allowed to meet Pakistan's top nuclear scientist.

I have no doubt that Pakistan has the bomb. Even General Zia, after Dr Khan's denial, told the TIME magazine correspondent as much—that Pakistan could assemble the bomb any time it wanted to. The lead in my story had said: "Pakistan has the bomb. Mr Abdul Qadeer Khan, father of the 'Islamic bomb' would not actually say that. But what he told me should be enough testimony."

When I met Wali Khan, an Opposition leader in Pakistan, in New Delhi during his father's illness, he told me that it was an open secret that the Pakistan government "used" me to break the story. Many newspapermen in India and Pakistan think the same way. My feeling is that Dr Khan went beyond his brief and was needled to spill the beans when I reminded him of a statement by

Dr H. N. Sethna, former Atomic Energy Commission chairman, that Pakistan had neither the men nor the material to produce the bomb.

Whether Pakistan used me or whether Dr Khan told too much may never be determined. But my story has been proved correct many times over.

But I would not have published the interview if I knew of the harm it would cause Mushahid. Had I even suspected that he would be forced to resign from the MUSLIM editorship, I would have withheld my report. Now the government at Islamabad has banned my entry into Pakistan—the land of my birth made alien to me by a tragic twist of history and which I have regularly visited, at least once every year, over the last two decades.

I am one who believes that one day the high walls of fear and distrust raised on the borders of the two countries will crumble and the people of the sub-continent, without giving up their separate identities, will work together for the common good.

Now that Dr Khan's interview is behind us, I wish both India and Pakistan could have an agreement on the bomb. The non-proliferation treaty is discriminatory because it is loaded in favour of the initial members of the nuclear club. Moreover China, India's neighbour, which has the bomb, has not signed the treaty. Therefore, any ban would have to embrace not only Pakistan but also China and the powers which have planes, ships and submarines carrying nuclear weapons in the Indian Ocean. But both India and Pakistan can agree upon the non-use of nuclear weapons.

To begin with, India and Pakistan should reaffirm the commitment not to attack nuclear installations. It may be tempting to some in India to talk of a strike at the Kahuta nuclear plant near Rawalpindi. But Pakistan in retaliation may bomb Bombay High and our nuclear set-up at Trombay; the F-16s supplied by America to Pakistan have the range and capability. Why now renew the promise given by Rajiv Gandhi to Zia that Indian will not attack Kahuta? It may begin a new chapter of friendliness between India and Pakistan.

/9274

Commentary Alleges India Real Nuclear Threat
51004713 Islamabad THE MUSLIM in English
21 Nov 87 p 4

[Article by Shariq Jamal: "Who Is Going Nuclear?"]

[Text] Recent the "Washington Post," published an article by Sen. John Glenn, fiercely criticising Pakistan's nuclear programme and declaring that it is weapon-oriented. Amazingly, the article came only a few weeks after the third SAARC summit in Kathmandu in which Prime Minister Junejo called for a ban on nuclear explosion tests.

The proposal abundantly demonstrates Pakistan's strong desire to keep the South Asian Zone—especially the subcontinent—a permanent non-nuclear area. In spite of the fact that the balance of conventional arms is hugely in India's favour, which amounts to a constant dread in Pakistan of aggression against it, Islamabad's stance on military nucleonics has always been clear.

The Indians, no matter what the Senator thinks, have been intransigent on all nuclear-treaty issues. They simply refuse to sign any intra-subcontinental or trans-subcontinental agreement banning nuclear tests which pave the way for the manufacture of nuclear weapons. This attitude, easily translatable into a tangible confrontationalist and hegemonistic outlook, has been the hallmark of India's policy vis-a-vis nuclear proliferation.

When in June, 1968, after protracted deliberation, the concept of nuclear non-proliferation was transformed into a written document, India flatly refused to sign it on the pretext that it was nothing more than a devious arrangement to help the big powers of the Security Council to increase their nuclear arsenal.

Explosion

This was followed by its nuclear explosion in May, 1974, which inaugurated and caricatured an epoch studded with localised nuclear-arms-propaganda duels between Pakistan and India.

In response to India's endeavour to gate-crash the nuclear club, Pakistan initiated a diplomatic campaign in the United Nations spearheading the proposal for denuclearisation of this part of the world along with security guarantees to non-nuclear weapon states. In this respect it has been submitting resolutions for a number of years now and its conspicuous role in attempts to keep the entangled issue alive has also been applauded by many member States.

India's response, however, has not been encouraging. On occasions it has opposed, at times remained indifferent and unresponsive, which has added considerably to Pakistan's swiftly mounting chagrin stemming from India's abiding military superiority. In December 1986, when the UN General Assembly approved Pakistan's oft-submitted proposals for a South Asia without nuclear weapons, India voted against it. The resolution, received 107 votes in favour with 41 abstentions. India also voted against the proposals on security assurances to the non-nuclear weapon States along with U.S., Argentina and Brazil. The proposal was approved by no less than 149 States. This year as well, the Pakistan-Bangladesh nuclear free zone proposal was adopted by the main committee of the General Assembly with India, Bhutan and Mauritius voting against it. India did not vote when the proposal regarding assurances was put to vote.

Assurances

In fact India is opposed to both negative and positive assurances—i.e., by the nuclear weapon states to the non-nuclear ones, right from the days of the nuclear non-proliferation or NPT negotiations which were a prominent feature of the ENDC or the 18-Nation Disarmament Committee deliberations in 1960s. Its already stiff and apparently unchangeable opposition of security assurances has hardened since then. Pakistan's fears of having another nuclear megastate, the other being the USSR, as its neighbour were to some extent approved by world media when it was reported in 1984 that two Jaguar Squadrons of the Indian Air Force were practicing "flip-toss" bombing in the Leh area using dummy nuclear bombs. The reports indicated that India had acquired the guidance system of the nuclear bomb as well as the militarily advantageous capability to weaponise expeditiously in the face of an urgency. These were followed by further reports that India was actively considering an attack on Pakistan's nuclear installations in close association with Israel. Appearing in all the important national and international papers, the reports perturbed Pakistan as Israel's attack on Iraq's nuclear installations was still haunting the world.

India's quest for a nuclear power status has its roots in the country's age-old ambition to become a superpower, not only in the regional sense but also in the global frame of reference. However, mainly due to economic and military hiccups and the ethno-cultural skimble-skamble, that distinction is yet to be achieved. But, as a result, over the years, despite Nehru's "Panch Silla," India has developed two very well-known and well-illustrated idiosyncrasies. One is its desire to seek new territories and the other is its effort to assume the role of a "manager" in the South Asian region.

The Sikkam drama of 1973, which came to an end in 1975 when Sikkam was made the twenty-second state of the Union of India, the East Pakistan crisis of 1971 and Tamil-Sinhalese dispute can easily prove the point. Similarly its love for the bomb also reflects the desire to catch up with the superpowers. At the same time it wants the other states of the region to live under its shadow and accept its hegemony over the entire South Asia. Much to India's discomfort this is not acceptable to Pakistan and China. In fact China severely dented India's military reputation during the 1962 Sino-Indian war. Although later on China withdrew its forces, for India the humiliation was complete. India had therefore, been less critical of Chinese actions and nuclear power.

Pakistan

On the other hand, Pakistan presents a different scenario. Both, militarily and politically weaker, Pakistan's endeavour to acquire nuclear technology, in whatever shape it may be, is India's biggest concern, notwithstanding its modest nuclear programme. Pakistan's nuclear installations have constantly been troubling India.

To keep the record straight it must be stated here that PINSTECH near Islamabad and KANUPP near Karachi are fully covered by the International Atomic Energy Agency (IAEA). The former has been subjected to approximately one hundred inspections. The Kahuta uranium enrichment facility is of a modest nature as well. But India has been constantly criticising Pakistan's peaceful nuclear programme with Stridency, its policy is to misinform the world about the programme and exaggerate to the fullest its impact on regional and international politics. Its propaganda network, one of the most powerful of the world, has played an important role in this respect. In the 70s it raised the bogey of a Pakistani-Islamic Bomb financed by Saudi Arabia to poison world opinion. In 1983 it alleged that Pakistan had exploded a nuclear device in the Lop Nor desert in Sinkiang with China's collaboration. Its lobby in the United States has been trying its best to malign Pakistan's image. Recently, when Prime Minister Rajiv Gandhi visited the United States he exhorted the Reagan administration to either stop or curtail U.S. aid to Pakistan so that it may not be able to acquire nuclear status.

Liaison

It is ironical that India wants to go nuclear or at least is desirous of having the nuclear option open to it because of the China-factor, but at the same time considers Pakistan's peaceful nuclear programme something that should be condemned. It is always ready to magnify the possible negative aspect of the programme and make it the vulnerable Achilles heel of U.S. aid, but its own nuclear liaison with the United States, which raises many pertinent question and infuses a spirit of bellicosity in the Indo-Pak relationship, is never even discussed.

In 1977 President Carter allowed the shipments of highly enriched uranium to India by lifting the ban on such exports. Again in 1980, the Carter administration ignored Pakistan's apprehensions and, after an arduous constitutional-political battle, brought congress round to its way of thinking as a result of which India received approximately thirty eight tons of enriched uranium. All this was done amid noisy propaganda that the United States is committed to nuclear non-proliferation.

But even now despite all the discriminatory actions of the United States, Pakistan fully endorses its non-proliferation objectives in South Asia and elsewhere. It has offered on many occasions, to ratify the non-proliferation Treaty if the other countries of the region are also willing to do so and is ready to accept any regional agreement banning the manufacture of nuclear armament. Aren't these offers in line with U.S. nuclear policy? If the answer is yes the ball is in India's court. In the meantime Pakistan has every right to continue with its nuclear programme.

/06662

Commentary Alleges Indian Insincerity on Nuclear Issues

51004712 Karachi DAWN in English
26 Nov 87 pp 9, 11

[Article by Mohsin Ali]

[Excerpts]

Arms Aid

If Pakistan had a nuclear-weapons programme, it would not propose the renunciation of the nuclear weapons option by both India and Pakistan. Nor would it advocate the joint inspection of each other's nuclear facilities and installations. No nuclear programme can be carried on in secrecy in the face of these on-site inspection and verification. Nor would Pakistan propose a nuclear weapons-free zone in South Asia if it was engaged in manufacturing nuclear weapons.

Likewise Pakistan would not offer to accede to the Non-proliferation Treaty (NPT) the moment India does so. After all, if constraints against the manufacture of nuclear weapons are to be imposed, it must be nondiscriminatory and apply equally to both the parties. Similarly, Pakistan's arms purchase programme should not upset the Indians. It is a modest programme of replacement of some of its outdated weaponry and arms. India enjoys an overwhelming superiority in its armour and might compared to Pakistan. In all three branches of its armed forces, India enjoys more than a five-to-one superiority.

Therefore, the replacement of some armour or the induction of new aircraft would not make any significant difference nor upset the existing balance of power. This is specially so when one considers the induction of massive Soviet supplied armaments, tanks and aircraft, into the Indian armed forces.

Similarly Pakistan has repeatedly denied having any hand in the Sikh terrorism in East Punjab. Pakistan does not train the Sikh terrorists and supplies them no weapons. And these can be checked and verified.

Yet despite these assurances to the contrary, irate clamour in India against Pakistan persists.

During his recent visit to the United States on his way back from the Commonwealth Conference in Vancouver, Prime Minister Rajiv Gandhi for instance launched a tirade against Pakistan.

He told the Press in Washington that "Pakistan may already have built a nuclear bomb" and he urged that "a cutoff in U.S. aid to Islamabad would significantly slow its nuclear programme."

Asked by reporters whether a cutoff of the U.S. aid package would curb Pakistan's nuclear programme, Mr Gandhi replied: "We feel it would very much more likely that they would stop their nuclear programme if your aid is cut."

He added: "Every bit of aid that you give them whether it is military or nonmilitary, goes in helping them divert their funds to their nuclear programme." He urged the Reagan administration "to stop Pakistan's nuclear programme in the interest of peace and security in the South Asian region."

Accusing Islamabad of engaging in a "furtive, clandestine and determined effort to acquire nuclear weapons by any and every means" Mr Gandhi demanded "its drive to acquire weapons must be halted."

"Twice on U.S. soil Pakistani agents had been caught redhanded trying to get materials used in nuclear weapons," he pointed.

Replying to President Reagan's suggestion that Mr Gandhi intensify a dialogue with Pakistan on nuclear issues, Mr Gandhi did not say that his government has spurned all Pakistan initiatives on this score. Instead he asserted: "We've tried to make so many steps but we just don't make headway."

Mr Gandhi said: "We're willing to talk about whatever Pakistan is willing to do. But they just don't talk and then if they talk, they don't move."

Mr Gandhi described India's relationship with Pakistan as the "most difficult and complex" of the ties in the region.

As Pakistan's official spokesmen have often asserted, the charges against Pakistan are wholly unwarranted and unfair.

This country is, in the words of President Zia-ul-Haq on a "peace offensive" and has always taken every initiative to halt the drift in the relations with India and put them on the track of responsive cooperation.

It was in this spirit that Prime Minister Junejo met Prime Minister Gandhi in Kathmandu and has agreed to a series of meetings to improve Indo-Pakistan relations. The two prime ministers, for instance, have agreed to hold an early meeting of the Secretaries of Economic Affairs of the two countries to discuss the promotion of economic cooperation and increase trade. They have also agreed to hold an early meeting of the Secretaries of Interior and Home Affairs for taking suitable measures to curb smuggling and illegal border crossing.

The Defence Secretaries of the two countries were asked to hold their third meeting to discuss a settlement of the dispute over the Siachen Glacier. Similarly, the Surveyors-General of the two countries would meet to demarcate the international boundaries at the Sir Creek close to the Rann of Katch. This will enable the two countries to demarcate the maritime boundaries between their countries. It will also fix Pakistan's 200-mile exclusive economic zone.

As a result of the nondemarcated maritime boundaries fishing vessels of each other are being frequently seized by the Navies and the Coast guards of the two countries for illegal intrusion.

The two prime ministers have also decided to summon a meeting of the Indo-Pakistan Joint Commission in the first quarter of next year in Islamabad. This will be the third meeting of the Joint Commission which is currently seized with a number of economic, cultural and educational problems.

Finally, the prime ministers decided that the foreign secretaries of the two countries meet at an early date to discuss issues of common concern.

These meetings should produce a climate of trust and confidence between the two countries for the meetings will deal with subjects that embrace the entire gamut of Indo-Pakistan relations.

Much of the fear and suspicion, for instance, would disappear if the two countries are able to negotiate a non-aggression pact or a treaty of peace and friendship.

Under such an all-embracing umbrella, smaller problems can be tackled in an atmosphere free from hostility and rancour.

Unfortunately, the history of Indo-Pakistan relations is littered with hopes aroused but unfulfilled and attempts at improving the atmosphere have been followed by clouding and fouling it up.

/12232

Commentary Defends Need for Nuclear Development

51004715 Lahore THE PAKISTAN TIMES in English
14 Dec 87 pp 4-5

[Article by Munir Ahmad: "A Nuclear Plan for Peace and Development"]

[Text] Refuting the vicious propaganda launched by the Western countries against Pakistan, President General Mohammad Zia-ul-Haq said the other day that Pakistan's nuclear programme was welfare-oriented and aimed at improving the lot of the common man. He further said that the nuclear institutes set up by the Pakistan Atomic Energy Commission including NIAB,

Faisalabad, in the field of health and agriculture were benefiting the common people. He added that these institutions have contributed a lot in boosting the agricultural production of Pakistan by applying latest methods and devices and thus making the country self sufficient in the field of wheat, rice, cotton and other agricultural commodities.

The President paid rich tributes to Pakistani agricultural scientists and researchers of these institutes, who through their constant and painful research had brought autarky in the field of agriculture.

Nuclear energy and nuclear techniques are being used in Pakistan for peaceful development purposes. The peaceful applications of atomic energy cover diverse fields such as power generation, agriculture, health, industry, sterilisation of medical supplies and food preservation etc., have had a great impact on socio-economic development of the country. Beginning from the use of conventional fuel for domestic and commercial application, the world has moved a long way to the use of nuclear energy. The role of each energy resource, i.e., wood, coal, oil, hydel power, etc., has been vital in that particular era when its supply was easy and price competitive. Now that rising expectations of the people have registered a sharp upturn, the availability of nuclear energy to sustain economic development has emerged as a fundamental policy imperative.

Without significantly enhancing its per capita consumption of energy, Pakistan cannot face the challenges of its socio-economic development. In fact, energy available to a Pakistani is one-tenth of what an average citizen of the world uses. Our economic growth will remain stagnant as long as it is restricted by low availability of energy inputs. This painful situation is further aggravated by the fact that our country is extremely deficient in fossil resources. Even the hydropower has obvious constraints on its further development. This gloomy energy situation leaves us with no other option except to turn increasingly towards nuclear energy for our development.

In some countries nuclear power is being exploited to the extent of 60 to 65 percent for electricity generation. According to IAEA projections, its share in the world electricity supply would rise from 15 per cent to 20 percent by the year 2000. Nuclear energy is one of the most concentrated forms of energy. One pound of uranium has the heat equivalent of 3 million pounds of coal or 2 million pounds of oil. In practice, in a 1000-MW nuclear present day, it is not possible to utilise more than one to two percent of the uranium fuel. The remaining uranium has to be recycled after re-processing. The breeder reactor enables us to utilise 60 to 70 percent of uranium. To generate 1000 MW of electricity throughout the year a modern oil-fired plant would require about 1.5 million tons of oil while an equivalent pressurised water reactor would need only 150 tons of uranium. This

indicates the concentration of energy in uranium and the importance of nuclear energy in the future economy and consumption pattern of the world.

Nuclear minerals constitute the basic raw material needed for the nuclear programme, be it nuclear power, radiotherapy, agricultural and medical applications or the nuclear physicist's adventure into the world of atom. Of the many mineral derivatives needed for industrial utilisation of atomic energy, ores of uranium thorium, zirconium, hafnium, beryllium, graphite, fluorite, lithium, cadmium, etc., have special significance. Of these the first two are needed as fuel and the rest for fabrication of cladding tubes, control rods, or coolant, etc. Additionally, two man-made (transmuted) fissile elements namely plutonium-239 and uranium-233 can also serve as a supplementary source of nuclear energy if mixed with uranium to provide "mixed fuels" for the thermal reactors.

Amongst all the nuclear minerals, uranium happens to be the most significant as a raw material for fuelling atomic reactors. The PAEC established a Directorate of Nuclear Minerals in 1961, which was upgraded to full-fledged Atomic Energy Minerals Centre, Lahore. This Centre has been charged with the duty of uranium resource development. It means that this Centre is responsible for the gigantic task of prospecting, exploration and analysis of all types of nuclear minerals. The first fuel bundle for commercial power reactor was prepared in 1978 when Pakistan joined 12 countries in the world in its fabrication. Uranium is mined, processed and refined by the PAEC scientists and engineers under difficult circumstances.

Zirconium is obtained from sands found along Mekran Coast. Fuel bundles for use at KANUPP are produced by the Commission. Zircon is an important reactor material for making an alloy for fabrication of fuel elements and pressure tubes, etc. Its use as a cladding material has gained importance because zircaloy does not offer any resistance to fast moving neutrons; possesses good mechanical strength; and is corrosion resistant. These properties have made it so valuable that there has lately been a spectacular increase in its consumption for nuclear energy applications.

In Pakistan nuclear energy was introduced in 1971 when the 137-MW Karachi Nuclear Power Plant (KANUPP) was commissioned. It has since been kept in operation at varying power levels in response to the local demand. The reactor supplied by the Canadian General Electric is of standard CANDU design and uses heavy water as moderator, reflector and coolant. The reactor building is designed for total containment of any pressure of activity resulting from any hypothetically possible accident.

In 1976 Canada decided to unilaterally abrogate its agreement with Pakistan and withdrew from the arrangement to which the IAEA was third party. Supply of fuel and necessary spares were cut off immediately despite

the fact that the plant was under IAEA safeguards. This posed very serious supply and safety problems for the operating country. Pakistan had no option but to develop some local capability for making essential plant's spares for refining uranium to the desired specification and for fabrication of fuel of international quality. These objectives were achieved in time to prevent a shutdown of the KANUPP. This policy of denial compelled Pakistan to acquire a lot of valuable technical and industrial experience in this process and train manpower. This has become a valuable resource for its future nuclear power programme.

The Commission's programme is not restricted to power generation alone. It also seeks to promote the application of nuclear and other advanced techniques to a number of socio-economic sectors. In agriculture, low productivity and salinity are the main problems. In this the Commission has indeed played a key role by serving as a pacesetter. The Commission runs three agricultural research centres in three different climatic zones of the country.

The first such centre, the Atomic Energy Agriculture Research Centre (AEARC), was established at Tandojam in 1963, the Nuclear Institute for Agriculture and Biology (NIAB) was set up at Faisalabad in 1972 and the Nuclear Institute for Food and Agriculture (NIFA) at Peshawar in 1982. These institutions are involved in multifarious research activities relating to the improvement of crops, problems of soil and fertilizer, storage of produce, biological methods for improvement of soil, nitrogen fixation, better utilisation of biomass, disease and insect control in various crops, and new biotechnological methods for the improvement of agriculture and agricultural produce.

Some salient achievements of these centres include introduction in Sind of three high yielding and rust resistant new wheat varieties. A high yielding, heat tolerant, shorter duration variety of cotton, NIAB-78, is being widely grown in Punjab and has been responsible for 30 percent increase in cotton yield leading to a record production of 7.1 million bales in 1985. A blight-resistant variety of chickpea, CM-72, introduced in 1983 has stabilised chickpea production, which, in previous years, had suffered from large scale destruction due to blight disease.

Five new varieties of mung-bean have been introduced which are of short-duration, high yielding and disease resistant. A mung bean crop can now be harvested within two months of its sowing Kashmir Basmati that can grow in Northern areas up to an altitude of 5,000 feet and can tolerate cold irrigation water, is being widely cultivated in Azad Kashmir, Swat and Hazara. A high yielding, fine grain, non-aromatic rice variety "Shadab" is ready for general cultivation in Sind.

A biological method has been evolved for fruitful utilisation of highly salt affected lands: salt tolerant crops are introduced which can be cultivated even when irrigated with brackish water, the biomass thus produced has been used as fodder, manure, for making pulp biogas and fuel alcohol. The land also improves during the process. Some farmers are now using salt tolerant plants to utilise saline lands.

It has been shown that Kallar grass can obtain its nitrogen from the air through association with nitrogen fixing bacteria. Legumes such as chickpea and mung bean can obtain 50-80 percent of their nitrogen requirements through symbiotic biological nitrogen fixation if properly fertilized with phosphorus and nitrogen. Inoculum of bacteria for these crops is being prepared at laboratory scale and is being distributed for trials.

Soils of Punjab have been mapped for their micronutrient status. It has been recommended that zinc in small amounts should be used as fertilizer for rice. Potatoes and onions can be safely stored for a long time without sprouting if they are given a small dose of radiation at the time of storage. Large scale irradiation facility is planned.

Storage period of citrus can be enhanced through a process patented a couple of years ago. Black rot in citrus can now be controlled by the use of a new antibiotic isolated and prepared within the country at NIAB. Fruit drop in mango can be controlled by the use of some chemical spray. Insect control through baits has been introduced in some orchards of Sind. Chickpea and citrus plants can be grown out of any part of the plant through tissue culture. The technique is being utilised for improvement of these plants. Toxic residues of insecticides have been studied for their harmful affects on animals, man and the soil microflora. In addition many other research programmes are going on at these centres and are expected to provide valuable economic utilisation.

The application of nuclear radiation and radioisotopes in medical diagnosis, treatment and research is another significant aspect of the Commission's programme. It has established eight full-fledged medical centres in the country. First of all these hospitals was set up in Karachi as early as 1960. Others are located at Jamshoro, Larkana, Multan, Lahore, Peshawar and Islamabad. These centres have facilities both for nuclear medicine and radiotherapy.

Construction of another medical centre is in progress at Quetta and it is expected to be operational during the next year. Another medical centre is being planned for Abbottabad. The PAEC medical centres are equipped with most modern diagnostic and therapeutic facilities. About 120,000 patients attend these centres annually.

All the PAEC medical centres treat patients suffering from malignant and non-conventional diseases for diagnosis and treatment with radioisotopes (radiopharmaceuticals) and radiotherapy. The specific organs studied are thyroid gland, brain, kidneys, liver, spleen, bones, lungs and heart. In addition, various studies related to blood are carried out. Various organs of the human body are either examined through a scanner imaged through a scintillation camera which allows functional studies in addition to structural studies of the organs. Computerised cameras with added accuracy in diagnosis are also available.

Oncology Wing includes radiation therapy and chemotherapy. The latest computerised equipment has been installed for this purpose. Superficial X-ray therapy, deep X-ray therapy and Cobalt-60 teletherapy machines are utilised to treat patients with various types of cancers. Patients with superficially located and deep-seated cancers are being treated in this manner.

Chemotherapy is used in addition to radiation therapy or alone, as required. This treatment gives additional benefit in various types of cancers. Special methods to treat cancer of female genital organs using remote, after-loading techniques are being practised. First Linear Accelerator has been installed at Nuclear Medicines, Oncology and Radiotherapy Institute (NORI) Islamabad. Similar equipment will be added to other medical centres to provide the patients with the latest techniques for treatment of deep seated cancer.

Nuclear hospitals also undertake research on topics of interest in collaboration with national and international organisations including international Atomic Energy Agency (IAEA). Training is imparted to postgraduate medical students at these centres. Atomic Energy medical centres have been provided with clinical and radio immunoassay laboratories, X-Ray equipment and facilities for ultrasonography. All patients are provided both diagnostic and radiotherapy services absolutely free of charge at these hospitals.

Sterilisation of medical devices and finished pharmaceuticals is planned to be undertaken in accordance with the recommended code of practice of the International Atomic Energy Agency (IAEA), and other international recognised codes and standards. The major advantages of irradiation sterilisation are simplicity, cleanliness, safety and reliability.

Gamma sterilisation of medical products is universally applied in the developed countries of the world, where it is a mandatory requirement. Medical profession in Pakistan has been denied the benefits of this advanced technology due to the absence of any gamma irradiation facility. With the increasing use of gamma sterilised bandages, disposable syringes and gloves, sutures transfusion and infusion sets, casualties due to infection will be reduced drastically ensuring better public medical care in hospitals and clinics.

It is most unfortunate that our nuclear plan is being vociferously attacked regularly whereas India's expanding nuclear programme is not taken notice of. In this context India's attitude has always been uncompromising. The propaganda drive by India against Pakistan is a smokescreen to cover up its own operations in the field. The other day the Indian Prime Minister did not hesitate to say that if Pakistan may have a bomb, he will surely go ahead with Nuclear weapons. On the other hand, Pakistan's persistent demand for a Nuclear Free Zone in this region and this country's various proposals to India including reciprocal inspection of each other's nuclear facilities and also the signing of a bilateral agreement not to race for nuclear weapons, have been flatly refused.

Whatever the hostile propagandists may say, Pakistan cannot abandon its nuclear plan for peaceful applications at a time when PAEC has attained self-sufficiency in the most advanced techniques and devices for the socio-economic development of the country.

08309

SUDAN

Former Officer Reveals Black Market Uranium Sales

51004601 Paris *AL-MUSTAQBAL* in Arabic
21 Nov 87 p 13

[Article: "The Sudan Is A Uranium Dealer and the Sudanese Are the Last To Know!"]

[Text] This is not the first time the Sudan has experienced a nuclear scandal. During the Numayri era, a plot was revealed which was aimed at transforming an extensive area of the Sudan into a graveyard for nuclear waste in return for a \$4 billion loan. This would have exposed the Sudanese and the surrounding parts of Africa to the danger of nuclear radiation.

The latest scandal, which was revealed on British television by 'Asim Qambashi, a retired Sudanese officer who had been a captain in State Security, involves a widespread uranium-selling network active all across the Sudan. This television program was made into a video film which was distributed in Khartoum. Sudanese Prime Minister al-Sadiq al-Mahdi quickly took the initiative and revealed the secrets of this black market trade on British television. He confirmed the existence of a black market in radioactive substances, in which one kilogram of uranium was being sold for \$3 million in Khartoum and radioactive materials were being smuggled to other African countries, which al-Sadiq al-Mahdi did not name. Furthermore, this past summer and towards the end of last month, quantities of such substances were sold to Iraq and Iran. The network is apparently quite large, and includes diplomats from the

Sudan and other countries. The network actually consists of three networks. The first one finds uranium overseas, the second one smuggles it into the Sudan, and the third one sells it to some country interested in obtaining uranium.

In a move to contain this operation, al-Sadiq al-Mahdi revived a scientific-government-security committee which includes Minister of Cabinet Affairs Salah 'Abd-al-Salam al-Khalifah, Police Chief Maj Gen Ibrahim

'Abd-al-Karim, and Sudanese scientists. Such a high-level committee was formed because of the seriousness of the operation from the security and humanitarian angles. What would happen in the Sudan if there were an accident involving this smuggled uranium? There would be a real human disaster. The selenium accident in Brazil is still on everyone's mind.

8559

FEDERAL REPUBLIC OF GERMANY

Moscow, FRG Firms Cooperate on High Temperature Reactor

Joint Research and Development
51002412 Frankfurt/Main FRANKFURTER
ALLGEMEINE in German 3 Nov 87 p 14

[Article by K.B.: "Application for New Subsidies for Reactors"]

[Text] The nuclear engineering industry intends now, with the the help of additional government subsidies, to develop the market for small high-temperature reactors. Brown, Boveri and Company (BBC) of Mannheim has already applied to the Research Ministry for subsidies for the further development of reactors with an output of 100 Megawatt. Initially, sales opportunities for smaller high-temperature reactors appear to be present mainly on foreign markets.

The Soviet leaders increasingly indicate that they wish to call on German equipment for the expansion of USSR nuclear energy. This is confirmed by an agreement lately concluded between the Kraftwerk Union (a member of the Siemens group) and the State Committee for Utilization of Nuclear Energy (FRANKFURTER ALLGEMEINE, 19 October). Last spring, Innotec Energietechnik, a German development syndicate, had already signed a cooperation contract in Essen. It is intended in both cases to elaborate a program with the aim of jointly further developing the technology of the high-temperature reactor and together building such types of reactors.

Other cooperation contracts are on the horizon. However, so far no orders worth billions are in view. The nuclear engineering industry is not yet able to estimate the extent of the cooperation now beginning. It appears very likely that, while wishing to utilize the highly developed German nuclear technology, the Soviet Union intends to limit the volume of orders. As far as at all possible, the Soviets prefer to secure energy supplies by their own capacities.

The first agreement on the high-temperature reactor provides that a "HTR 100 Development Syndicate" cooperating with Soviet experts should, within 18 months, submit a conception for a nuclear power plant with an output of 100 Megawatt. This is to create the prerequisites for contract based cooperation. The conception is to be based on development work by BBC and Hochtemperatur-Reaktorbau GmbH (HRB) of Mannheim, who have constructed a 15 megawatt prototype plant in Juelich and a 300 megawatt demonstration plant in Hamm-Schmehausen. The members of the development syndicate seeking orders in the Soviet Union include BBC, HRB, Babcock, Mannesmann Anlagenbau [plant construction], Strabag and Innotec. In its capacity as the syndicate's sales company, this latter prepared the agreement with the State Committee for Nuclear Energy.

The second agreement bases on the work on a high-temperature reactor by Kraftwerk Union and the Siemens subsidiary Interatom. The planned program aims for reactors with a 200-250 MW thermal output. They are to serve as modules capable of combination in a reactor line.

Kraftwerk Union reports that the agreement on the high-temperature reactor represents a first step in cooperation with the Soviet Union. Other possibilities for cooperation are being explored with Soviet agencies. Negotiations are under way on safety equipment, on the supply of testing and inspecting devices, personnel training and waste treatment as well as on the question whether more reactors might be jointly further developed and constructed.

The Soviet Union wishes the high-temperature reactor to be available as an additional nuclear power line in order to be able to produce process and domestic heat as well as electricity. It is retaining the plans for the construction of pressurized water reactors. They do not appear to have definitely rejected the Chernobyl type graphite moderated pressure tube reactor. The possibility cannot be excluded that they will continue to construct such reactors with improved safety precautions.

According to reports from Moscow, the Soviet officials responsible for energy supplies and nuclear energy appreciate the competitive German offer of high-temperature equipment. In view of the fact that two programs for a high-temperature reactor are being simultaneously developed, two sources of information are available for such equipment, although—admittedly—the Soviet Union has also been working on such a development for quite some time. As yet there is no market for this type of reactor. So far there is no indication whether the two German competitors (both offering equipment heavily subsidized by the government) will continue to separately develop a market for this product, or whether they will in future cooperate for that purpose.

Siemens, Moscow Sign Agreement
51002412 Frankfurt/Main FRANKFURTER
ALLGEMEINE in German 19 Oct 87 p 17

[Text] Siemens KWU department has signed an agreement in Moscow with the State Committee for Utilization of Nuclear Energy with regard to cooperation on nuclear power plants with modular high-temperature reactors. Siemens reports that, within the framework of this agreement, groups of experts from both partners to the agreement will initially (that is within the next 11 months) analyze concepts and criteria of high-temperature reactor nuclear plants with outputs ranging from 200-250 Megawatt. In the course of these efforts, a program will be established for the joint development and construction of such HTR [high-temperature reactor] modular nuclear power plants, including the relevant components. Replying to a question, a KWU

spokesman said that it is not yet possible to estimate the order potential. KWU and the Siemens subsidiary Interatom of Bergisch Gladbach have been jointly engaged in the development of high-temperature reactors since 1973. An application for the official approval of the conception of a modular HTR was submitted in Lower Saxony in May 1987.

11698

FRANCE

Nuclear Export Policy Examined

51002414a Paris DEFENSE NATIONALE in French
Dec 87 pp 105-119

[Text] The authors of this article are students of the Institute of Political Studies (IEP) of Paris. Advised by Professor Raoul Girardet, they have presented an interesting summary of the problems posed by nuclear proliferation and especially, France's original, reasonable policy on the export of nuclear materials for civilian purposes.

The expression "Islamic bomb" associated with remarks made by Ali Bhutto shortly before his death had a great impact and recalled the dangers of nuclear proliferation. Two NEW YORK TIMES reporters then published a book by that title in which they accused the French Government, acting with full knowledge of the facts, of having given certain Muslim countries access to the nuclear technology needed to manufacture atomic weapons.

Questioned shortly after the Israeli bombing of the Iraqi nuclear power plant (Osirak) on the question of possible French responsibility for nuclear proliferation, Vice Admiral Pierre Emery, former adviser to President Valéry Giscard d'Estaing on foreign nuclear affairs, stated: "These accusations are false. And I can say that for the 3 years from 1978 to 1981 during which I was involved in such matters, France's only true ambition, on the contrary, was to prevent nuclear proliferation."

Would these two facts, by virtue of the very laxity and incoherence they demonstrate, the very evocative power of their notoriety, be sufficient to characterize and illustrate France's nuclear export policy? If it did suffice in the eyes of the public, which is not always well-informed, the true nature of that policy is nevertheless somewhat different, or at least deserves more clarification. Whatever the case, the exportation of nuclear equipment inherently contains a dilemma. While all nations, whether they have nuclear weapons or not, agree on preventing their proliferation, how is one to ensure that the sale of a nuclear power plant, for example, whose production would make it possible to overcome energy shortages, could not subsequently be used to manufacture a military device, especially since certain nations have not concealed their determination to do so and when nuclear industrialists face load plan problems? (1)

Consequently, a nuclear export policy should be analyzed based on many aspects, in particular: adherence to various provisions taken by the international community to prevent nuclear proliferation for military purposes; respect for the desire of other countries to have access to nuclear energy for civilian purposes; the drafting of strict regulations concerning transfers of technology, whose public power ensures their implementation; and the definition of an industrial policy adapted to the desires of a small number of potential buyers.

Thus it is that by studying French nuclear export policy from the angle of these essential considerations, the famous dilemma of the peaceful use of nuclear energy previously mentioned, instead of being obsolete, will appear, on the other hand, to be the major element of a future world energy policy.

Transfers of Civilian Nuclear Technology

From the Civilian to the Military: Paths of Proliferation

A nuclear power plant is indeed no bomb, but it is still very difficult to dissociate "civilian" from "military" atoms. And in fact, two paths lead from one to the other.

The first uses greatly enriched uranium whose isotope 235 has been upgraded by 93 percent.

Uranium enriched only to a low degree (2 to 5 percent) and destined for nuclear power plants can therefore not be used to make bombs. In contrast, the 95-percent enriched uranium that fuels research reactors is perfectly suited to that purpose. Moreover, it is possible for a nation to enrich the uranium itself. Complex and costly, the technique has not been mastered by the United States, the Soviet Union and France (2).

The second path is plutonium. The plutonium 239 that is used in military nuclear programs does not exist in the natural state. It is obtained from uranium coming from research reactors (the solution used by Israel and South Africa) or nuclear power plants (India's solution) after reprocessing the radioactive fuels. Consequently, it is the main fuel for the Superphenix breeder reactors in France.

Of these two choices, the latter seems the most practical. Nevertheless, diverting civilian nuclear technology for military purposes is a delicate operation and research is trying to develop systems making it possible to reduce the risk. In this connection, one has to hail the efforts of the AEC aimed at developing relatively nonproliferating technologies, particularly the development in 1977 of the so-called "caramel" fuel that can supply nuclear power plants but is unsuited to any military use. However, this is not a panacea because in 1979, France came up against Iraq's refusal to use the fuel for the Tammouz reactor. It would therefore not appear that it is in the field of scientific research that we shall now find a solution to the problem of proliferation.

International System of Nonproliferation

This double civilian and military vocation of atomic energy very quickly demonstrated the need to establish a system of nonproliferation in order to preserve the world balance linked with respect for two requirements: development of the Third World and control of atomic weapons by those who already had them.

On 8 December 1953, President Eisenhower delivered his "Atom for Peace" address before the United Nations, proposing the creation of an international organization of control. This proposal was to lead to the establishment of the International Atomic Energy (IAEA) responsible for controlling the peaceful use of fuel. Euratom was set up that same year with the goal of providing a reliable supply of fissionable materials and, at the same time, ensuring compliance with standards of safety and physical protection. Several events would subsequently supply new motives for serious negotiations on giving up the weapon, including: the start of American-Soviet detente, conclusion of the Moscow Treaty on nuclear testing and the shock created by the explosion of the Chinese bomb in October 1964. These negotiations would result in the signing, on 1 July 1968, of the Non-Proliferation Treaty that went into effect on 5 March 1970 following the three trustees (the USSR, the United States and Great Britain) and by 40 other nations (3). Along with the guarantees of the IAEA on which it is based, the treaty, now signed by 114 nations, constitutes one of the bases of the political system of nonproliferation. The latter in fact prohibits signatory nuclear powers from transferring any of the weapons or other explosive devices and instructs the IAEA to proceed with control of the peaceful use of fissionable materials. On the one hand, signatory countries with nuclear weapons agree to subject their exports of sensitive products to another nation to IAEA guarantees and pledges not to provide countries not in possession of nuclear weapons the techniques and facilities needed for a bomb (Article 1). On the other hand, signatory countries not having atomic weapons promise never to accept the transfer of such arms or any other aid for the manufacture of explosive nuclear devices and agree to subject all their nuclear facilities and materials to inspection by the Vienna Agency. In exchange for giving up atomic weapons, signatory countries gain the right to have access to all nuclear technology not for explosive purposes.

The treaty and recognition of the IAEA as the institution of control gave rise to hope for a return to stability.

However, two events suddenly introduced a break in that system of nonproliferation: the end to the cheap supply of oil, resulting in an intensification of European nuclear programs, and the explosion of India's bomb in 1974, a bomb designed to use plutonium produced by the Candu-type reactor (Canadian subsidiary). This explosion recalling the link between civilian and military programs was the root cause of an attempt to strengthen measures aimed at slowing down proliferation if it

indeed could not be halted. Concerned about preventing commercial competition from running counter to that effort, the main suppliers of nuclear materials and equipment have repeatedly met in London since 1975. These meetings have now been suspended. They "drew up a basic list on exports and agreed on common criteria relating to technology transfers." Although no embargo was imposed, not even on exports of reprocessing or enrichment units, these instructions from London do in fact mark a net evolution of the nonproliferation system. In fact, as Bujon de l'Estang has noted (COMMENTAIRE, No 9, spring of 1980), one leaves the contractual domain here (that of the nonproliferation treaty) and enters the regulatory regime (4).

Generally respected by suppliers, the London directives have nevertheless not been totally satisfactory. Far from halting proliferation, they have apparently given rise to a deep feeling of frustration in Third World countries, while at the same time creating a demand for equality whose maximum expression came when Ali Bhutto claimed the right of Islamic civilization to the bomb, a demand soon imitated by many nations (the Jewish bomb, Israel; the South African bomb; the Arab bomb, Iraq; and so on).

Nonproliferation: A Precarious Balance

The London directives did not resolve the dilemma of nonproliferation any more than the treaty had done. The dilemma was, in short: helping all countries so wishing to master the nuclear energy needed for their development, while avoiding the risks of proliferation.

Without question, the system set forth does exhibit some imperfections and the difficulties of controlling civilian use of nuclear materials do remain. It is little likely that any improvement in either of these domains will check proliferation, but proliferation could be slowed down.

The nonproliferation treaty presents a number of inadequacies. The most harmful among them has to do with the absence of specific benefits for "non-nuclear" signatory countries, which explains the hesitation of some in signing. This is all the more true because to date, nations concerned about avoiding the constraints of nonproliferation and refusing to sign the treaty (Argentina, India, Israel, Pakistan and South Africa) have been able to import nuclear materials and equipment, if not as easily as signatory countries (they sometimes have to go through several suppliers, use middlemen, and so on), then at least with the same effectiveness. The United States agreed to sell power plants or fissionable materials (5) to India and Brazil, for example.

The weaknesses of the guarantees offered by the IAEA must also be emphasized. No one today can distinguish a civilian from a military explosion. This means that in 1974, India had no need to claim to be engaging in civilian testing because no one could prove the contrary!

However, of the difficulties facing the Vienna Agency, this is no longer the most important one because the treaty not only bans military explosives, but all nuclear explosives. Essential limitations have to do with the very status of the IAEA, which controls all nuclear facilities and materials only in signatory countries (6) and makes inspections only after receiving authorization from officials warned in advance! If there has been a diversion, action is limited to warning the UN General Assembly of that fact, although this in itself is not totally negligible.

Despite these inadequacies, the Nonproliferation Treaty, the IAEA and the London directives now comprise the backbone of the nonproliferation system. It is indeed a precarious edifice, but it is maintained nevertheless by the determination of nations which are truly concerned that, at a time when commercial competition is increasingly relentless, countries might be inclined to bend their export policy.

The political stakes are also decisive. For example, the decision to be made by the United States on the renewal of economic and military aid to Pakistan will be decisive. While there can be no doubt that that country is now capable of building an atomic bomb, Islamabad nevertheless remains the United States' only true support in the region.

Therefore, at a time when the question of nonproliferation reemerges, it is interesting to look at the french position on the matter.

French Position

Even today, few countries have achieved complete mastery of the nuclear process and have the materials and equipment required to make an atomic bomb. Being among those countries, France must accordingly accept its responsibility. From the very beginning, it has refused the idea of any freeze on exports of nuclear equipment. At the same time, it denies any accusation of carelessness and claims it is determined to exercise vigilant control over exports of sensitive materials and equipment.

Apparently Ambiguous Position in Principles

France did not sign the Nonproliferation Treaty but has shown a concern for respecting its underlying principles. This choice can be explained by General de Gaulle's desire to preserve control over its nuclear export policy. In his eyes, the Nonproliferation Treaty has never been anything more than one more measure aimed at strengthening the superpowers' monopoly at the expense of other nations.

Consequently, France's foreign nuclear policy was initially very independent. No regulation checked exports. What is more, it benefited from the limitations which treaty signers had imposed on themselves. It is within such a context that the first nuclear cooperation accords were signed with South Korea, Pakistan and Iraq.

The latter were criticized by the United States, which did not hesitate to label the French policy of exporting nuclear technology as careless. The agreement with Pakistan was signed in spite of everything, as the latter had finally accepted the principle of IAEA control over facilities provided by France. In 1978, that contract was broken, inasmuch as the economic purposes seemed dubious, while the military aims appeared to be more than likely. As for the agreement with South Korea, it was suspended after that country had to withstand pressure from the United States. This troubled period of French foreign nuclear policy revealed the inadequacy of export control structures.

As a result, in 1976, France decided to become a member of the Club of London, thereby clearly marking its intention of doing nothing that might challenge the principle of nonproliferation. By supporting the London directives, it in fact agreed that its exports to countries not possessing nuclear weapons should be controlled by the IAEA. Consequently, the Gaullist analysis of the question of nonproliferation was not abandoned. France's position in the Club of London has always been that of a moderator and France was among those most firmly opposing the American determination to restrict transfers of sensitive nuclear equipment or materials to the extent possible.

Quite simply, by participating in Club meetings, it was demonstrating its determination to implement a less proliferating policy and complete control exports. That determination was concretely expressed in 1976 by the establishment of the Foreign Nuclear Policy Council (CPNE), responsible for defining the main guidelines of that policy and drafting terms of control.

From the very first meeting of the Council, the principles of foreign nuclear policy was the subject of an official bulletin in which it was specified that France, convinced of the importance of nuclear energy as a "competitive and necessary" source for the development of many countries, agreed to help them by supplying "the services of the fuel cycle that might be requested of it." Hostile to proliferation, it nevertheless strengthened its conditions for guarantees linked to export.

Based on that bulletin, which still serves as a reference document, it is apparent that foreign nuclear policy in fact depends on control procedures relating to exports of materials and on the government's determination to implement them.

Likely Complexity of Control Procedures

Decisions concerning the foreign sale of sensitive nuclear materials were long made by the government without the government itself or the president having the information made available to properly evaluate their scope. The CPNE was borne precisely of President Giscard d'Estaing's desire to close that gap. Headed by the president, the Council includes, in addition to the prime minister,

the ministers of Foreign Affairs, Economy and Finance, Defense, Industry and Research, Foreign Trade, and the general director of the AEC (7). It now hands down rulings only infrequently.

Actually, it is a smaller interministerial group (GIR) that has the task of evaluating the risks of proliferation implied by the sale of sensitive materials or equipment. Within the Ministry of Foreign Affairs, administratively speaking, it brings together the representatives of the ministries previously named and of the AEC. It is therefore apparently more of an administrative than political structure.

In practice, these control procedures are more complicated because they entail the participation of various individuals from different ministries. They are described in detail in a bulletin from the prime minister dating from 1979. As for the list of sensitive materials (8), they are the subject of notices to exporters published in the *JOURNAL OFFICIEL* by the Ministry of Foreign Trade. Without our describing the applicable provisions in all their complexity, it is nevertheless fitting to note that the authorization to export such materials—from the standpoint of nuclear proliferation is the fruit of an interesting interministerial consultation: the Ministries of Foreign Affairs, Defense, Foreign Trade, Industry, and the Atomic Energy Commission.

The GIR therefore intervenes here as a possible structure of concertation in the case of disagreement, which may then lead to the intervention, for arbitration, of the prime minister, if ever the participants fail to come to agreement. The decision to authorize export is therefore reached either after unanimous agreement or after arbitration. Furthermore, even if there is a favorable decision, export requests concerning exports of sensitive materials to Eastern countries must be examined based on the COCOM [Coordinating Committee for East-West Trade] procedure under end user control.

Those uninformed might be surprised by the great number of participants, as well as the distinction made between sensitive materials and equipment. However, this is not the essential point. Actually, it would perhaps be more interesting to try to foster reflection, not on the nature or missions of the GIR, but rather, on its place within the Ministry of Foreign Affairs. The example of the procedure applicable to arms exports could, in this connection, provide not a model—there is none—but at least a background for analysis. Without wishing to present it in its entirety, it will suffice to recall that exports of war materiel are authorized by the prime minister following a ruling handed down by the Interministerial Commission for the Study of War Materiel Exports (CIEEMG), which is headed by the general secretary of national defense, who takes action under the authority of the prime minister (9).

Concerning the nuclear export control procedure, it will be recalled that while the list of sensitive materials is kept up to date by the Office of General Secretary of National Defense and while the latter does participate in interministerial consultations, the GIR is not thereby an advisory structure under that authority. It would rather seem to us, however, that it would find its rightful place within the SGDN, an interministerial organization par excellence and acting directly for the benefit of the prime minister (10).

Impact of Economic Factors on French Foreign Nuclear Policy

Since 1974, France has been embarked upon an ambitious program to build nuclear power plants that is now coming to an end. Actually, while four production phases were completed in 1986, only two are planned for 1987 and 1988 and a single one for 1989. Consequently, the French nuclear industry is forced to export its equipment. However, the situation as it shapes up is not very promising. Actually, not only did Iran cancel its order for a plant at Abadan (11), but world demand appears to be lackluster, given the absence of sales between 1981 and 1985.

Consequently, out of 21 reactors exported between 1974 and 1986, only six were reportedly delivered by Framatome. They were destined for South Africa (the Koeberg plant), South Korea and the People's Republic of China. However, France has real assets in this field. The very fact that it has a large pool of plants in operation is a decisive advantage because with the "assembly line" effect, French exporters can offer competitive prices (12). Unfortunately, competition is now heated and France's rivals are many, with the United States (Westinghouse and Bechtel) and the FRG (KWU) being the main ones.

Therefore, even if the experts are striving to prove that a world resumption of orders for nuclear power plants should come about in the long run, one has to survive in the meantime, essentially meaning maintaining industrial capacity and ensuring the consistency of research teams. To do this, exports will be the only possible path. However, everything will finally depend on the ability of the different protagonists concerned to adapt to the needs of the potential customers. In this field, the concern for coordination is imperative, but not always easy to achieve. First of all, there is the large number of participants: the government, the different agencies (Ministries of Industry, Foreign Affairs, Economy, Finance and Privatization Defense), the Atomic Energy Commission, the French [Electric] Power Company (EDF), Framatome, Alstom Atlantique, outfitters, public works companies, and so on.

One already has a large number. But if one considers solely the strictly industrial domain, problems have not been solved; far from it. To realize this, one has but to note that while logic would have France propose French

turnkey solutions, meaning that the French enterprises will supply everything necessary, commercial wisdom would have Framatome (13), which supplies the nuclear superstructure, join forces with a foreign concern for the conventional elements, while leaving civil engineering up to the client country by way of compensation.

For the South African power plant, the French did everything. In South Korea, they still did a great deal, but had to subcontract out a large share of the deal. In contrast, for the Chinese Daya Bay plant, the solution was a new one: Framatome supplied the nuclear superstructure, while the British General Electric Company (GECC) supplied the conventional elements. Campeon-Bernard, in partnership with Chinese and Japanese firms, is in charge of civil engineering. The EDF is responsible for technical assistance.

This plan does in fact offer very favorable aspects. First of all, it questions the idea sometimes held in France that only the big conglomerates, diversified in the extreme, are now capable of winning major export contracts. The key to the future is also our manufacturers' ability to cooperate with foreign industrialists in supplying the most acceptable offer possible. Given the very high cost of building a power plant (70 billion francs, including intercalary interests) and the fact that solvent countries are increasingly rare, it is preferable to spread the cost and the credit-insurance risk over several national insurance organizations. COFACE [French Foreign Trade Insurance Company], which handles insurance in France, should favor such a solution rather than agreeing to handle a single Franco-French [sic] contract with the political and economic risks that it would entail (14).

Finally, international cooperation on supply leads to negotiation with complete freedom, without it being absolutely necessary to defend the load plans of other national industrial partners.

Therein lies Framatome's success in China, perhaps, even if it must be counterbalanced by the fact that the project will not bring France a great deal of money and may even lose money.

These are the consequences of the overriding obligation now befalling the sector, consequences that mean that today, in order to sell, one has to be both flexible and imaginative. Some have gone as far as to say that the KWU would accept the principle of concession if perchance it were to build a power plant in Turkey (15). This is easily understood: Therein resides the challenge of exporting nuclear power plants. To survive, one has to sell, but at ever-higher costs and not to just anyone, in order to protect the future. But in this field, the unpredictable definitely appears to be the prevailing factor. Who, in fact, would ever have predicted Chernobyl and its impact on the execution of major civilian nuclear programs?

At the conclusion of this article, it is easy to grasp the full extent of the difficulty in analyzing a nuclear export policy. In this connection, French policy has on the whole and in spite of everything avoided two dangers:

Excessively rigid limitations imposed on countries buying nuclear materials was the first. Is it necessary to recall that President Carter's Nonproliferation Act apparently encouraged proliferation, paradoxically enough, particularly by requiring that all equipment, whether supplied by the United States or not, had to be controlled. For its part, France requires control solely over what it delivers (16).

An excessively lax, even uncontrolled, commercial policy based on current economic needs was the second. Such policy remains subject to the policy defined by the government.

Finally, whatever the case, by virtue of the potential dangers it entails, nuclear energy will always require that nations buying or selling nuclear technology exercise caution and rationality. A nuclear power plant is neither a commonplace facility that can be sold without restrictions, or a prestige accomplishment for a developing country seeking international status, even if it becomes a subsequent threat to its neighbors. Irrationality constantly lies in wait for the main protagonists in such matters, although one nevertheless hopes that the mere saving and innovative aspect of nuclear energy will in the end prevail.

Footnotes

(1) However, one must note that a nuclear power plant of the PWR type (pressurized water and enriched uranium) is not particularly proliferating, for example, which is not perhaps the case of the heavy-water plant used by India. Out of 381 reactors in service in the world, 152 are of the PWR type; 25 heavy-water. (2) To be complete, one should also cite the People's Republic of China, the Group of the Three (Great Britain, the Federal Republic of Germany, the Netherlands) and, apparently, Pakistan. (3) France did not sign the Nonproliferation Treaty. (4) This "regulatory system" must be understood as a "good conduct" code. (5) This was possible, however, before the Nonproliferation Act signed by President Carter in 1978. (6) Signatory countries not possessing nuclear weapons. (7) Atomic Energy Commission. (8) The procedure on the control of exports of sensitive materials is described in another directive. (9) Order No 78-78 of 25 January 1978, defining the powers of the Office of General Secretary of National defense (SGDN), responsible for aiding the prime minister in the exercise of his defense responsibilities. (10) However, one should certainly not compare the sale of a nuclear power plant with that of an arms sale. (11) Other countries such as Spain, Luxembourg or Italy have canceled their orders. (12) The Chinese Daya Bay nuclear power plant now under construction is a copy of the one at Gravelines, which was able to be presented to Chinese officials in size, type and operation. (13) Framatome is a member of a group, the

CGE [General Electric Company], along with Alsthom Atlantique, which supplies the turboalternators, Neyrpic, the mechanical reactor elements, and Les Cables de Lyon, insulating materials. In addition, it is interesting to note that Dumez, the public works concern, is, along with the EDF, a co-shareholder in Framatome. (14) It would appear that Framatome wants to change its mind, joining with the German firm KWU in supplying one or several small reactor(s) to Indonesia. (15) Actually, the KWU proposed to build and operate a nuclear power plant during a specific period. Actually, it was the Canadian Candu that was to win the contract, which was finally given up by Turkey. Moreover, it still appears that Yugoslavia, because of financial difficulties, is still reflecting on that formula. (16) A certain number of countries apparently reacted in order to overcome these obstacles by developing scientific cooperation of the South-South type. In this connection, one might mention the China-Pakistan, Argentina-Brazil and Israel-South Africa agreements.

11464/12913

IRELAND

Banning of Plutonium Overflights Deemed 'Impossible'

51500087 Dublin *THE SUNDAY PRESS* in English
29 Nov 87 p 6

[Article by Colm Keena]

[Text] The legislation to ban or control planes over Ireland carrying massive quantities of deadly radioactive material—as is planned by French and British companies on a regular basis by 1992—is almost impossible to enforce.

An agreement signed by the Reagan administration with the Japanese on November 4 last, for the international transfer of plutonium, opens the way for plans to move some 45 tonnes of plutonium from Europe to Japan by the year 2000.

But already the new development is coming under fire from those concerned about the operation. The Governor of Alaska is to take the US Federal Government to the courts, on the basis that safety cannot be assured.

An amendment introduced in the US Senate eight days ago demands that the containers used to hold the fuel must undergo several tests. They must survive a 288 mph crash, and an 800 degree C fire for an hour.

This amendment will cause major problems for British Nuclear Fuels, and their French counterpart, Cogema. BNF had designed a container which they have been testing for the past month at a military base at Pandine, in South Wales. the implications of the latest US move will now have to be considered, says BHN.

Reprocessing for Years

The British and French have been reprocessing spent Japanese nuclear fuels for years, and the Japanese want the plutonium extracted in the process returned. Already one consignment has been returned by sea. In October 1984, the *Seishin Maru*, set out from Cherbourg for Japan, with 250 kgs of plutonium on board. The shipment took six weeks, and was escorted by the British, French, US and Japanese navies during its voyage, as well as being given air cover and satellite surveillance.

The expense, slowness and security dangers of this form of transport have stopped any further shipments, as the system of transport by air is prepared. Each weekly flight, planned by the French and British to begin in 1992, will carry 250 kgs the same quantity as the *Seishin Maru*.

The 250 kgs of plutonium would be sufficient to make 25 atomic bombs.

The British plan to join the French as the major exporters of plutonium in the world. Flights will travel from Britain, and northern France, across the Atlantic, to Anchorage in Alaska, and from there on to Japan.

Air traffic control experts told *THE SUNDAY PRESS* that the routes taken by aircraft travelling from the UK or France, across the Atlantic, vary widely depending on weather conditions.

Flights from the UK and northern France would cross over Ireland, and at other times would not. "Sometimes flights from Southern Italy will cross over Ireland on their way across the Atlantic", said one.

The Irish Air Navigation Act controls the passage of aircraft through Irish airspace. An order made under this Act obliges foreign aircraft not to carry munitions, weapons or dangerous goods through Irish airspace.

Regulations compiled by the International Civil Aviation Organisation, "the UN of the air", state that only small quantities of plutonium may be transported. US nuclear authorities have passed as safe a container which holds only 25 kgs of plutonium, and state that only such container may travel in any aircraft.

Unauthorised Flights Rise

The former Minister for Foreign Affairs, Peter Barry, when questioned in the Dail in December 1986, revealed that 5,814 aircraft had flown through Irish airspace in the previous three years, without authorisation.

The former Minister said then that this practice had now been stopped. the stringency of the Irish laws had been emphasised to foreign states, a spokesman for the

Department of Foreign Affairs said yesterday. The Department is confident that foreign powers are now observing the laws of the country, he said.

Deputy Michael Keating, emphasising that he was referring to all nuclear powers, said that he believed this Irish law was "more breached than observed, but it is very difficult to do anything about it."

Mr Keating, who raised the matter in the Dail last December, said it was time the Government took stronger action on this issue.

Both the British and French nuclear authorities say that plans about which airports the deadly cargo would be travelling from, have not yet been decided on.

The French separate the plutonium at a plant at Cap la Hague, and the British will use their Thorp plant at Sellafield, due for completion in 1992. During the Windscale inquiry in the Thorp plant, in 1977, no information was given on how the British intended to transport the plutonium to Japan.

Military aircraft carrying nuclear weapons fly throughout the world's skies. There are two known cases of military aircraft crashing, and scattering plutonium. One occurred in 1966 in Palomares, Spain, and the other in Greenland, in 1968.

Government figures released in January of this year, showed that one in six aircraft flying over Ireland belongs to NATO. Under Irish law, these aircraft must not carry weapons, munitions, or dangerous goods, yet it is NATO policy not to disclose if an aircraft is carrying nuclear weapons or not, for security reasons.

/9274

TURKEY

Canadian Firm Drops Bid to Build Nuclear Plant
51002413 *Istanbul TERCUMAN in Turkish*
6 Nov 87 p 10

[Text] Ankara—It has been learned that the Canadian firm has withdrawn its bid to build a nuclear power plant in Turkey in response to pressure from Western countries which are concerned that Turkey may build a nuclear bomb. It has also been reported that, immediately after the elections, negotiations will begin with a consortium made up of the West German firm KWU and the Turkish firm, Kutlutas, in connection with the construction of a nuclear power plant.

The Canadian firm, AECL, which had formed a consortium with ENKA, had won the Akkuyu nuclear power plant contract and Prime Minister Turgut Ozal had signed the agreement. It is said that the senior command of the Turkish Armed Forces also supported the nuclear power project which AECL would build with the

"Jandu" technology. According to information obtained by the UBA correspondent, the Jandu technology was used in the construction of a nuclear power plant in Pakistan. Western countries were alarmed when Pakistan made minor modifications in this technology and "gained the capability to build an atomic bomb."

Opposition from Greece, Israel and France to Turkey's plans to build a nuclear power plant using the Jandu technology resulted in a deadlock in efforts to procure financing for the project. Speaking to the UBA correspondent on this issue, an official said: "Concern over the possibility of an atomic bomb caused the Canadian firm to withdraw from the project. Power plants built with this technology can manufacture nuclear bombs with minor modifications."

Stating that a nuclear power plant was built in Pakistan with the same technology and that that plant is now working to build an atomic bomb, a senior official said that "this situation has unsettled the West" and that "it is very difficult to control the Jandu technology."

KWU-Kutlutas Consortium

It has been stated that when all of Turkey's hydroelectric and thermal resources are phased in, Turkey will be able to generate only 140 billion kilowatt-hours of electricity a year in the 2000's and that, consequently, six nuclear power plants must be operational by the year 2000. An energy report submitted to the government urges the acceleration of the construction of nuclear power plants. It has been learned that negotiations with the KWU-Kutlutas consortium will be accelerated immediately after the elections. Turkey will bridge its energy shortfall in the 2000's with six nuclear power plants and it will not use the Jandu technology in these power plants.

9588

UNITED KINGDOM

Decision To Withdraw From Geneva Lab Delayed
51500079 *London THE DAILY TELEGRAPH in English*
16 Dec 87 p 2

[Roger Highfield]

[Text] Britain will not decide on withdrawal from the world's leading particle physics laboratory until the implications of a cost-cutting review have been digested, it was said yesterday.

Efficiencies at the Geneva-based laboratory, known by its French acronym CERN, consisting of a management shake up, staff reductions of 10-15 percent, and the opportunity for its 14 member States to withdraw from some of its research programmes, have been proposed.

Because of currency fluctuations and Britain's shrinking science budget there will be a L17 million shortfall in the money available to fund CERN in 1988/89.

This has led to speculation that Britain would announce its withdrawal at CERN council meeting in Geneva tomorrow, when the report containing the efficiency proposals is to be presented.

However, the report was instigated at the request of Britain, so it would be a major embarrassment to withdraw before its full implications were assessed, a leading science adviser said yesterday.

'Difficult To Justify'

A CERN spokesman also ruled out withdrawal. He said Britain is expected to wait at least until a discussion of the effects of the proposals at a council meeting in February before deciding its future with the laboratory, where particles are collided at extremely high energies to recreate conditions not seen since the Big Bang, when the universe was born.

The CERN budget runs at around L300 million a year.

Britain's contribution has shot to about L60 million a year because of the fall in value of the pound against the Swiss franc, eating a large hole in the Science and Engineering Research Council's L360 million budget.

Recently the Advisory Board for the Research Councils warned: "If the costs of CERN were not markedly reduced it would be difficult to justify continued membership on scientific grounds alone."

/9274

Shortcomings in Post-Chernobyl Monitoring Noted

To Be Investigated

51500080 Leeds YORKSHIRE POST in English
19 Dec 87 p 1

[Article by John Furbisher]

[Text] Evidence of shortcomings in the Government's post-Chernobyl nuclear monitoring, which was revealed by the Yorkshire Post, is to be put before a Commons Select Committee investigating the issue.

Labour's front bench agriculture spokesman, Dr David Clark, said yesterday that he would ensure the committee examined the findings. A dossier is being prepared and will be sent to Westminster.

The wide-ranging investigation by the Commons Agriculture Select Committee will begin in February.

It was announced in response to mounting pressure from environmentalists and Opposition politicians for an inquiry, following the Yorkshire Post's revelation that a radiation hot spot in West Yorkshire went undetected by the Ministry of Agriculture for more than 18 months after the Russian nuclear disaster.

The committee of 11 backbench MPs will examine the Ministry's co-ordination of the response to Chernobyl, and hear the views of the communities affected.

Report on 'Radiation Hotspot'

51500080 Leeds YORKSHIRE POST in English
28 Nov 87 pp 1, 8

[Article by John Furbisher]

[Text] Independent scientists from Oxford University have confirmed that part of Yorkshire was hit by considerable fallout from the Chernobyl nuclear accident.

A team from the university's Department of Nuclear Physics tested soil in Ilkley last week following the Yorkshire Post's revelation of a radiation hotspot in the area.

Their results show radiation readings in soil from a town centre garden more than ten times greater than were found in Oxford—which was not hit by Chernobyl fallout—during the past two or three months.

"We took the reading from a garden in the town centre because we wanted to know what radiation there was in the ground where people were living," he said. "We were not particularly looking for radiation which might get into the food chain."

The Yorkshire hot spot was indicated in a Met Office report which collated previously unlogged rainfall figures. They showed that the moorland around Ilkley and Skipton was hit by heavy rainfall on the weekend of May 3 and 4, 1986 as the radioactive cloud from the Russian reactor was passing overhead.

Though the report had been completed in February this year, the Ministry of Agriculture, which tests for radiation in foodstuffs, remained ignorant of it until this newspaper's disclosure earlier this month.

Since then ministry scientists have been testing intensively on the moors and have found two sheep with caesium readings above 1,000 becquerels per kg—the action level set when livestock restrictions were imposed in Cumbria, Wales and Scotland.

Ilkley is on the fringe of the hot spot identified by the Met Office. It is known that fallout deposits itself more thickly on higher ground and the Met Office calculated that highest ground deposition of radiation in Yorkshire after the accident would have been at a point some ten to 15 miles North-west of Ilkley.

Dr Holmes concluded: "There is a clear indication that the Ilkley area received considerable fallout during the Chernobyl weekend."

Meanwhile, a Labour MP said the ministry checks for radiation on livestock which feed on the Pennine moors around Penistone are being carried out "rather late in the day."

Mr Allen McKay, MP for Barnsley West and Penistone, said he felt insufficient attention had been paid to this part of his constituency after the disaster.

He said: "I have now been told that carcasses of sheep and other livestock living on moorland around Penistone are now being examined by environmental health experts to check radiation levels.

"This seems rather late in the day because I would have thought these tests would have been done just after the accident occurred and not now, over a year later.

"There are a lot of sheep on the moors in this area and it will be very interesting to see that the tests reveal."

An official of Barnsley Council's consumer and environmental health services said they were still awaiting results of the livestock tests.

He added that following the disaster they had tested milk, water and vegetables.

Last night the Tory MP for Keighley, Mr Gary Waller, said following a meeting with Ministry of Agriculture officials that he was satisfied that people living in his constituency had not been exposed to abnormal levels of radioactive caesium following Chernobyl.

He said: "There has never been any chance that sheepmeat from Yorkshire which could ever pose a risk to people could actually enter the human food chain.

"Some people in the area have been worried about milk and vegetables. There has never been any need to restrict milk or vegetables even in Cumbria, and all the readings taken in Yorkshire are very much lower than there. I am therefore entirely satisfied that there is no cause for worry."

But Mr Waller said there were lessons to be learned about measuring the effects of radiation, and added: "Even though we must hope that nothing like Chernobyl ever happens again, we should not have to rely in future on readings provided by amateur meteorologists which become available well after the event.

"The Met Office should be ready to set up ad hoc measurement stations in areas not normally covered if a situation like this ever recurs."

Humberside councillors have called for clearer marking of vehicles carrying radioactive products, particularly those which are safe to handle only for a short period.

Members of the council's special sub-committee for the disposal of radioactive waste said they were concerned about such vehicles being involved in an accident.

The acting deputy director of technical services, Mr David Elver, told the sub-committee that placards identifying vehicles carrying radioactive products had much less information on them than those carrying other hazardous materials.

The sub-committee agreed to refer the matter to the council's public protection committee for consideration.

It also considered a strategy document from the Government's nuclear waste disposal agency NIREX which reveals that it is looking for a site to dispose of military nuclear waste—and identifies almost the whole of the county of Humberside as geologically suitable for deep disposal or radioactive waste.

The sub-committee chairman, Coun Mrs Margaret Crampton, said the document, entitled *The Way Forward*, was the first time NIREX had admitted having any connection with the Ministry of Defence.

And the council's projects manager, Mr Alex McKenzie, said there were a number of areas of concern over the document, one being the exclusion from the consultation process of district councils because they were not strategic planning authorities.

He said NIREX was going ahead with identifying sites, but no official announcement of those selected would be made until next September, so that it could be ten months before Humberside knew whether it had been identified again as a potential nuclear dumping ground.

The sub-committee decided to delay making an official response to the document, but Coun John Bryant wondered whether the public could feel confidence in an organisation like NIREX, which had already "blotted its copy book"—he would rather have a body independent from the nuclear industry to advise the Government directly.

He was also concerned about some of the things that were not mentioned in the NIREX document, such as the retrievability and manageability of radioactive waste.

Coun Mrs Crampton said she understood the question of possible sites had been taken up by MPs who wanted to know whether their constituencies were involved, and NIREX had assured them it would keep them informed.

She suggested the council should write to MPs and to adjoining councils to ask if they had heard of any geological investigations taking place.

She added: "NIREX claims it wants to be open and consult everyone and I think we should press for further information about its programme over the next six months."

/9274